Irving SCHLEIN

Text by John Noble WILFORD

Pioneer 10 Pushes Beyond Goals, Into the Unknown

a musical commentary for Narrator and Orchestra

1983

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ISSM - 135

Words adapted directly from
"Pioneer 10 Pushes Beyond Goals Into the Unknown"
by John Noble Wilford.
Originally published by the New York Times, April 26, 1983.

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Instrumentation

3 Flutes (inc. piccolo)
3 Oboes
3 Bb Clarinets
2 Bassoons
4 F Horns
3 Bb Trumpets
3 Trombones
Tuba
Percussion:
- Timpani
- Triangle
- Cymbals
- Gong
- Bells
- Chimes
- Snare drum
- Bass drum

2 Harps
Celesta
Strings

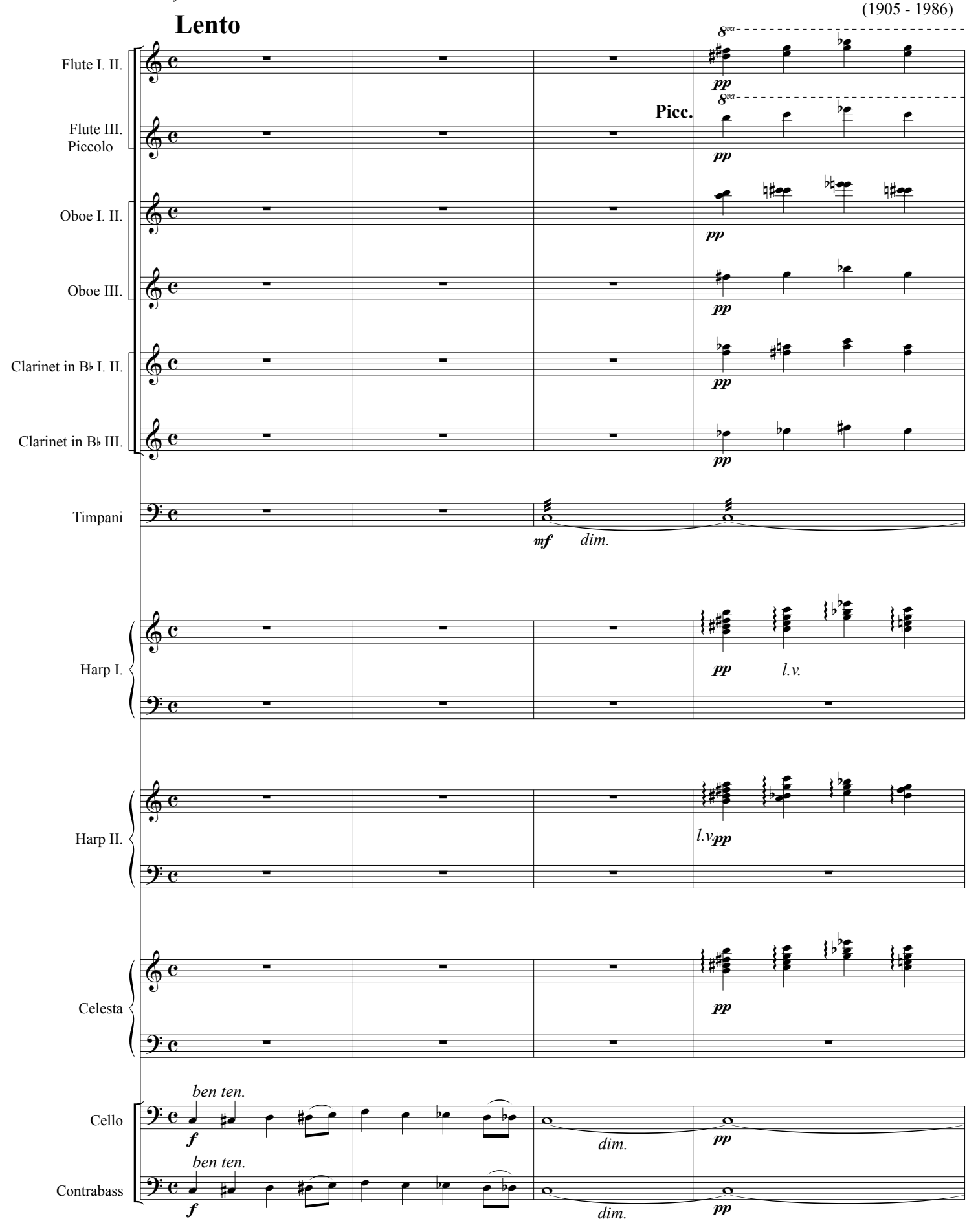
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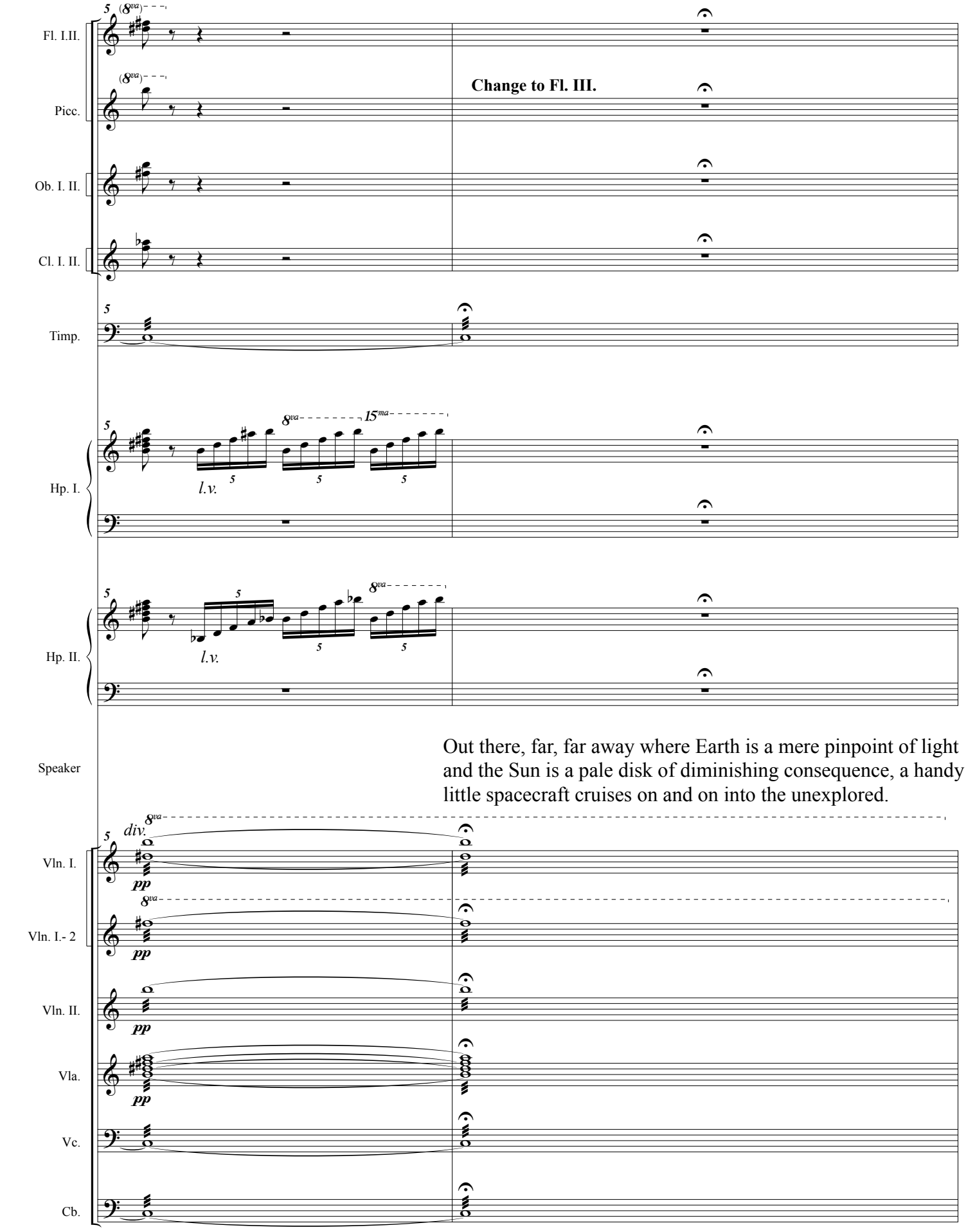
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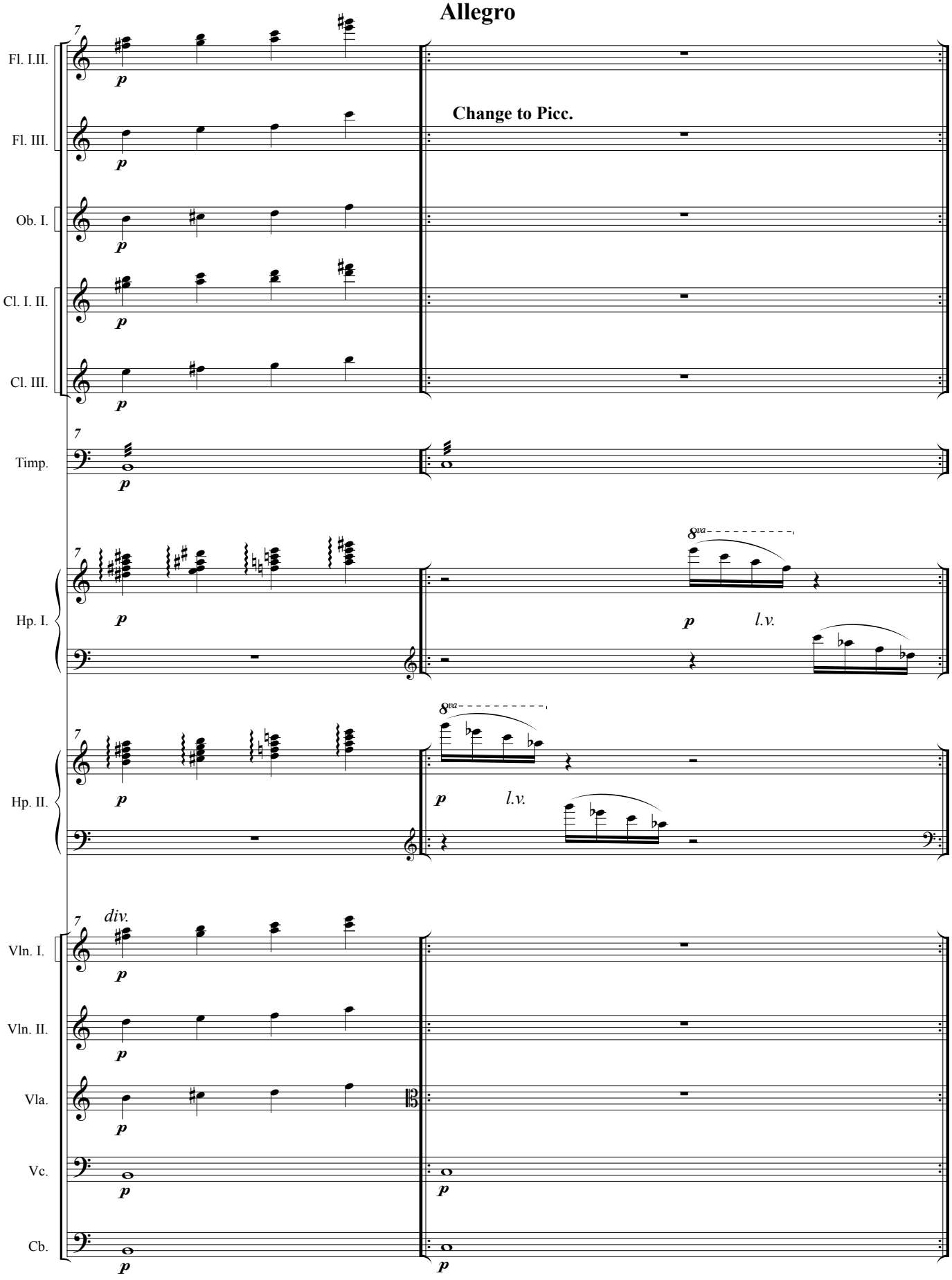
Pioneer 10 Pushes Beyond Goals, Into the Unknown

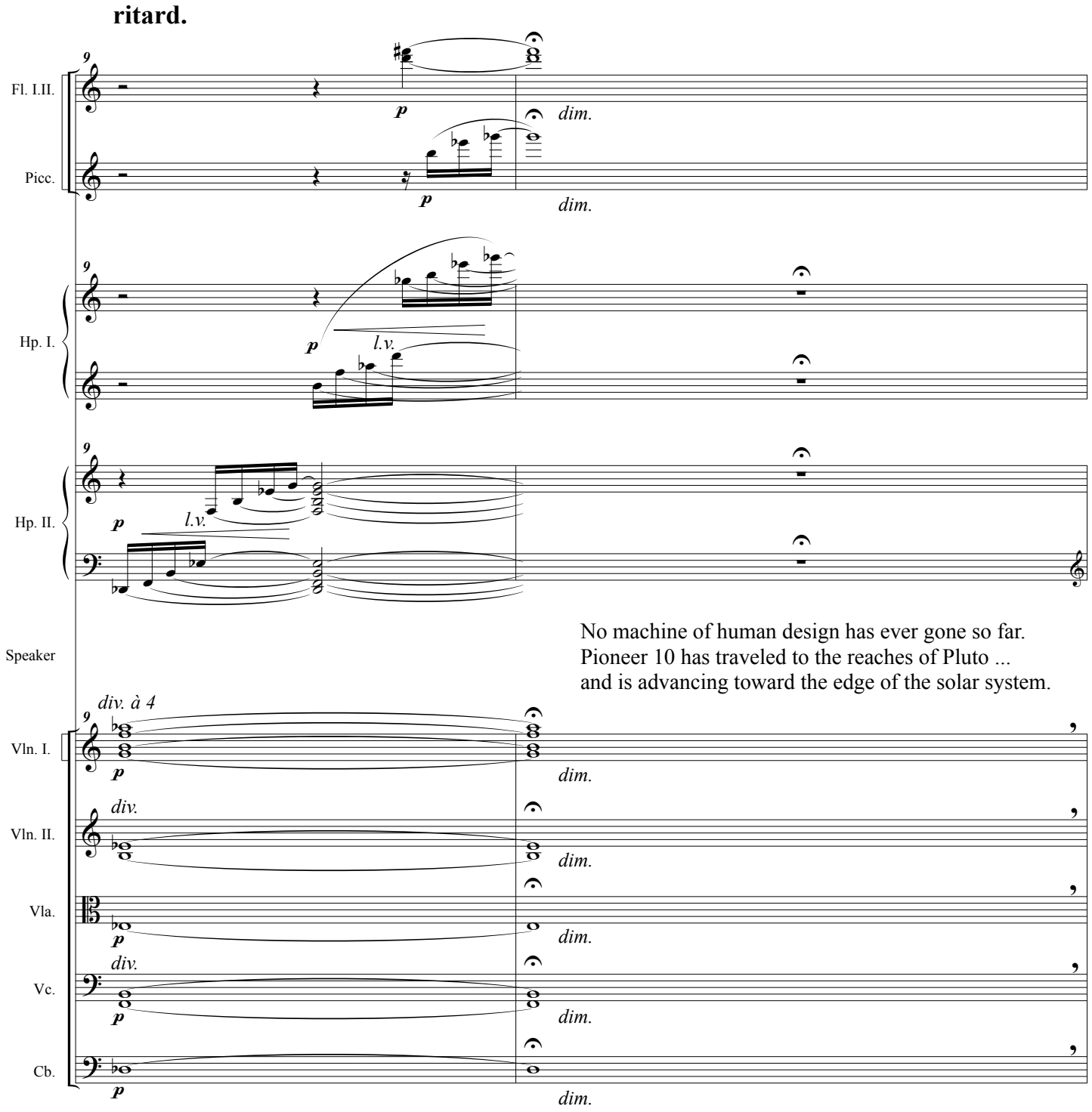
Text by John Noble WILFORD

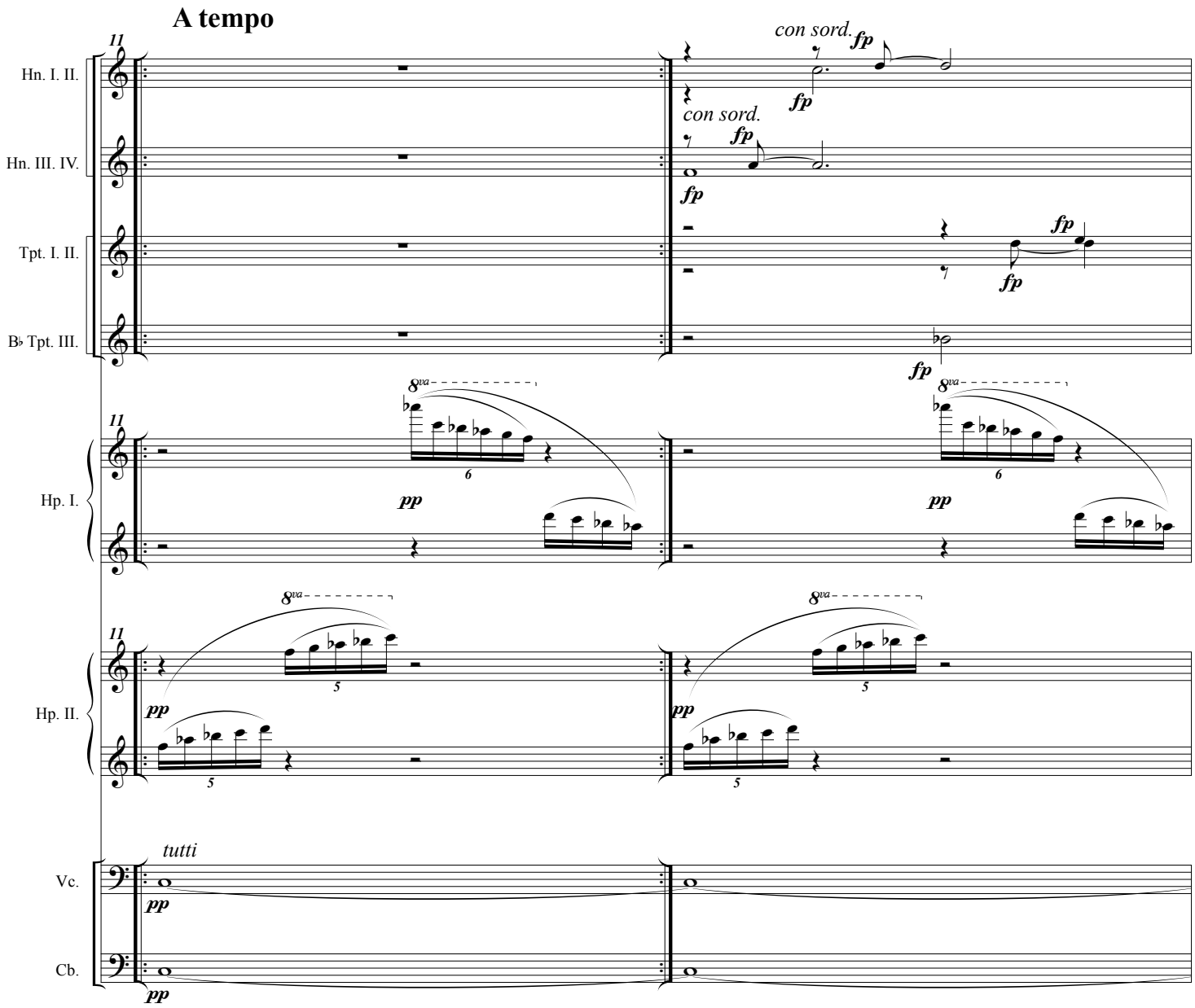
Irving SCHLEIN
(1905 - 1986)

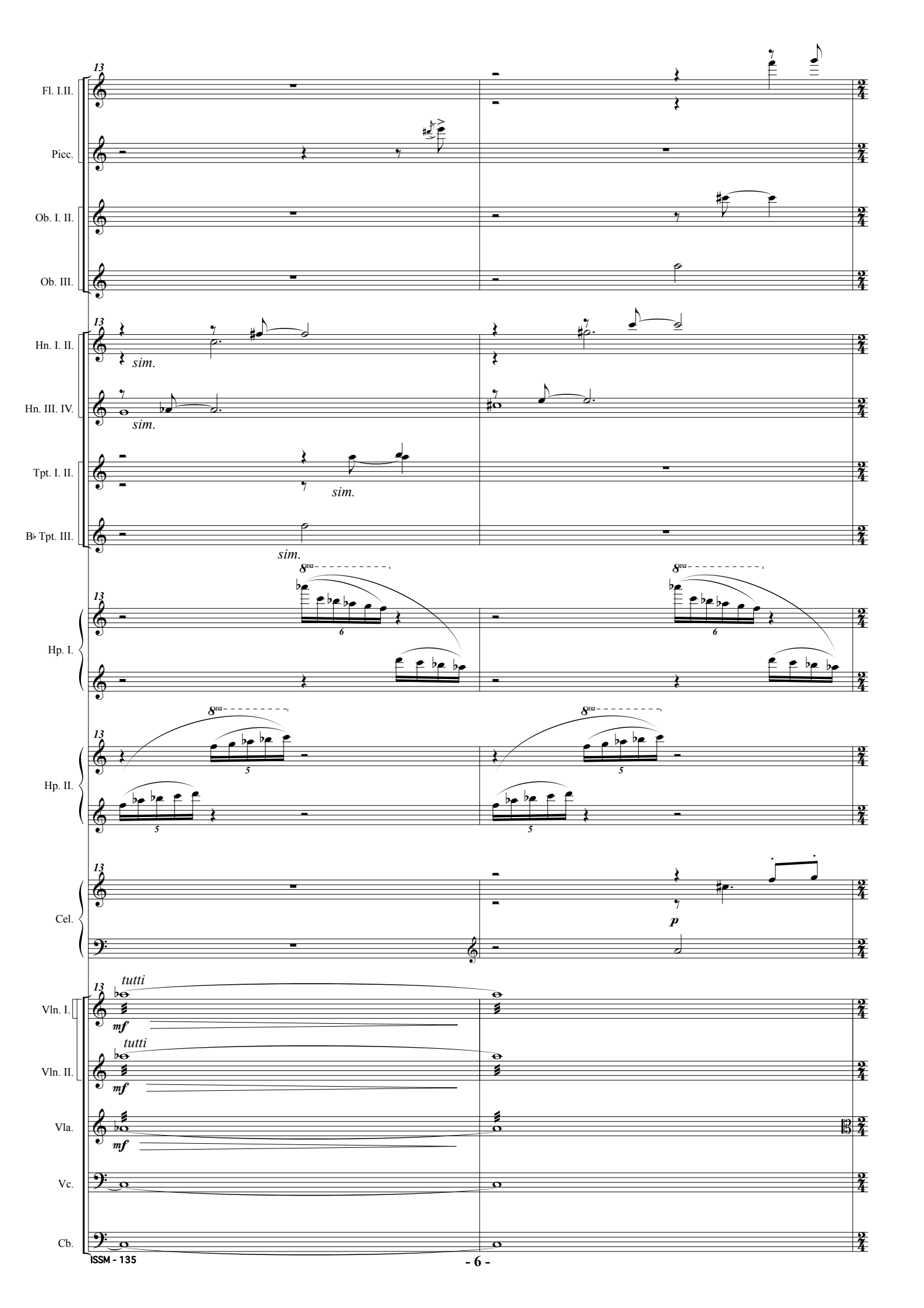


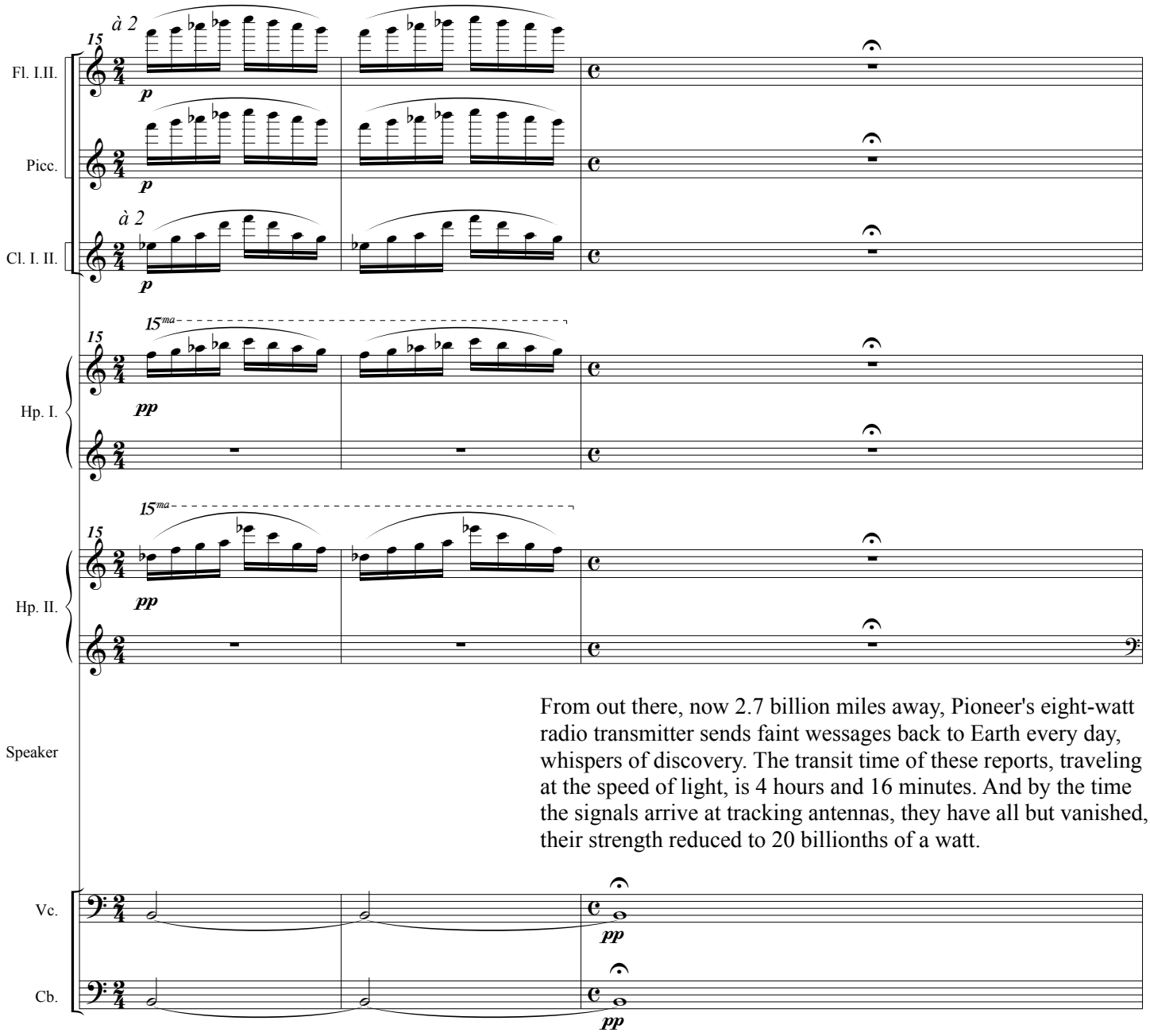

Fl. I.II.
Picc.
Change to Fl. III.
Ob. I. II.
Cl. I. II.
Timp.
Hp. I.
l.v.
Hp. II.
l.v.
Speaker
Out there, far, far away where Earth is a mere pinpoint of light and the Sun is a pale disk of diminishing consequence, a handy little spacecraft cruises on and on into the unexplored.
Vln. I.
div.
pp
Vln. I.- 2
pp
Vln. II.
pp
Vla.
pp
Vc.
Cb.

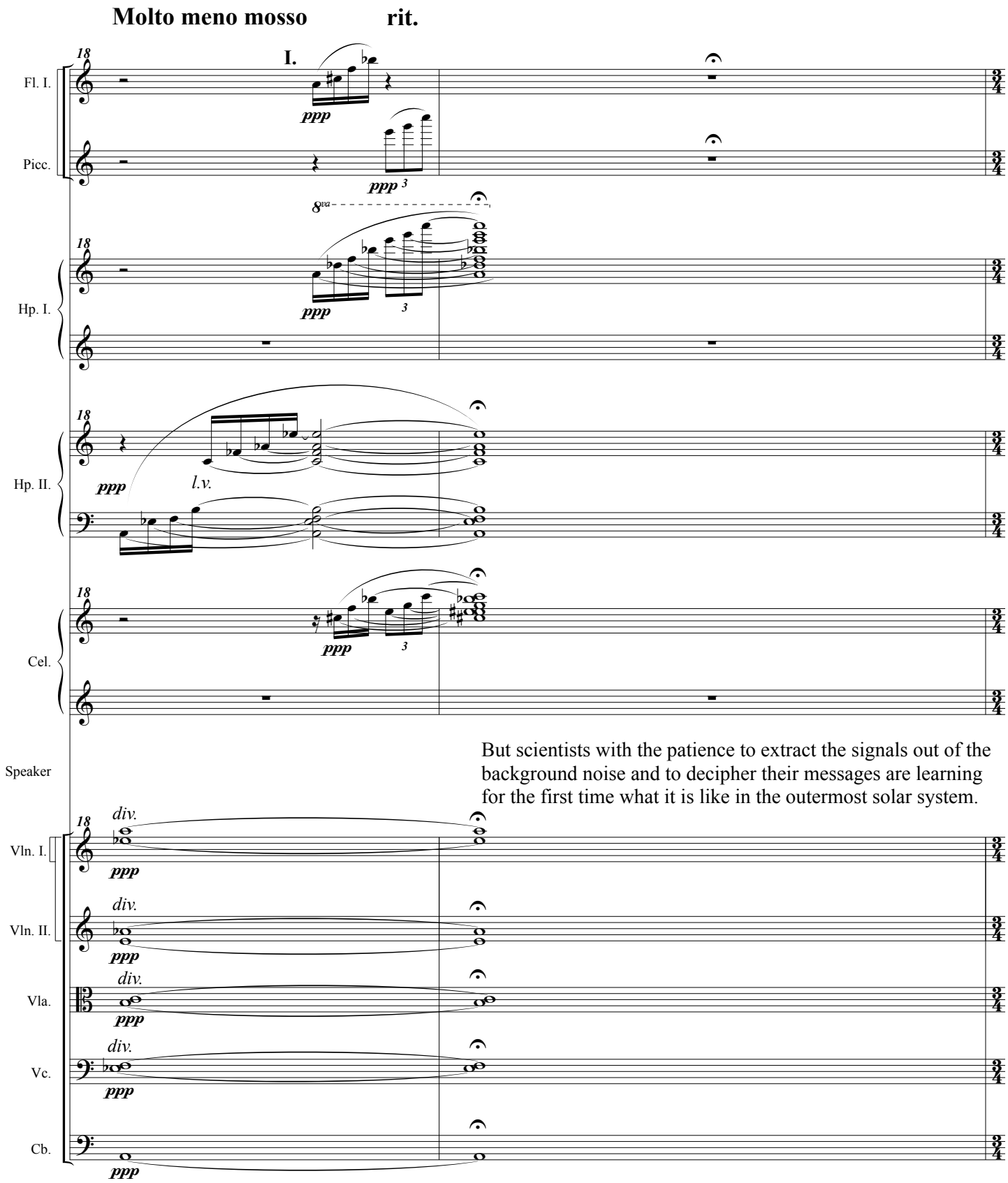

Allegro
Fl. I.II.
Fl. III.
Change to Picc.
Ob. I.
Cl. I. II.
Cl. III.
Timp.
Hp. I.
8va
l.v.
Hp. II.
8va
l.v.
Vln. I.
div.
Vln. II.
Vla.
Vc.
Cb.

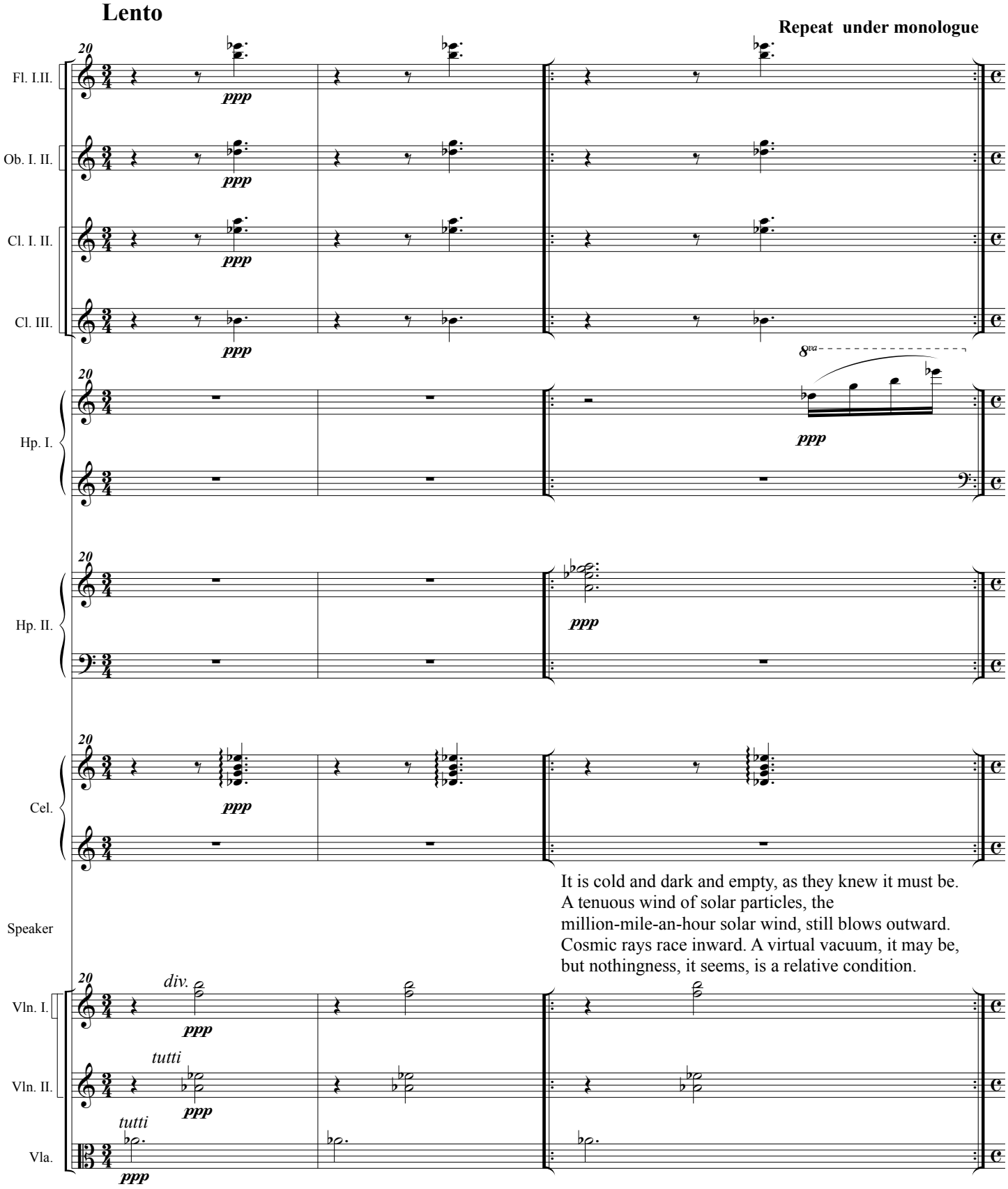

ritard.
Fl. I.II.
Picc.
Hp. I.
Hp. II.
Speaker
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
p
dim.
l.v.
div. à 4
div.
No machine of human design has ever gone so far.
Pioneer 10 has traveled to the reaches of Pluto ...
and is advancing toward the edge of the solar system.

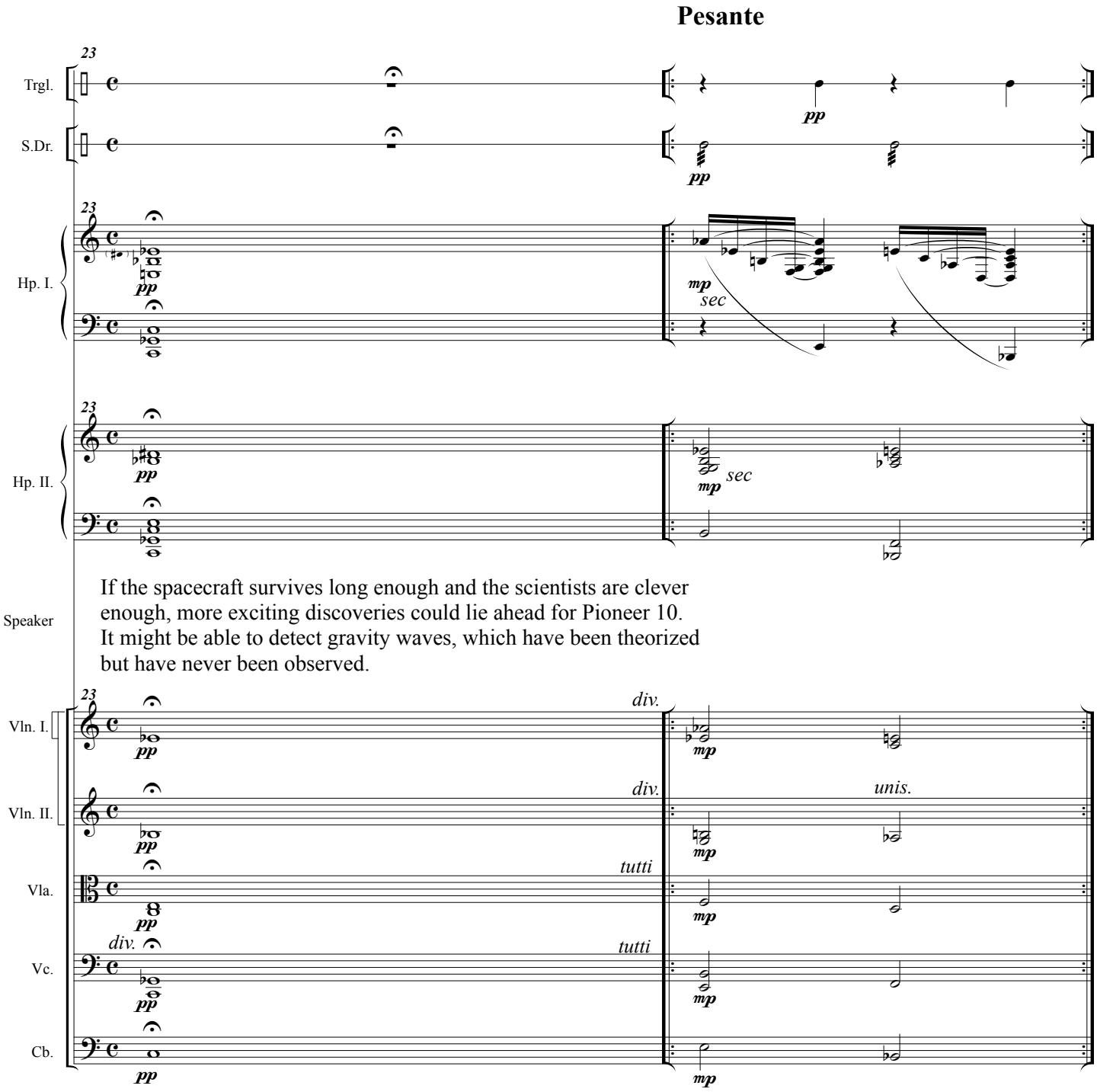

A tempo
11
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
con sord.
fp
con sord.
fp
fp
fp
fp
fp
8va
6
pp
8va
6
pp
Hp. I.
11
8va
5
pp
8va
5
pp
Hp. II.
11
tutti
pp
Vc.
pp
Cb.

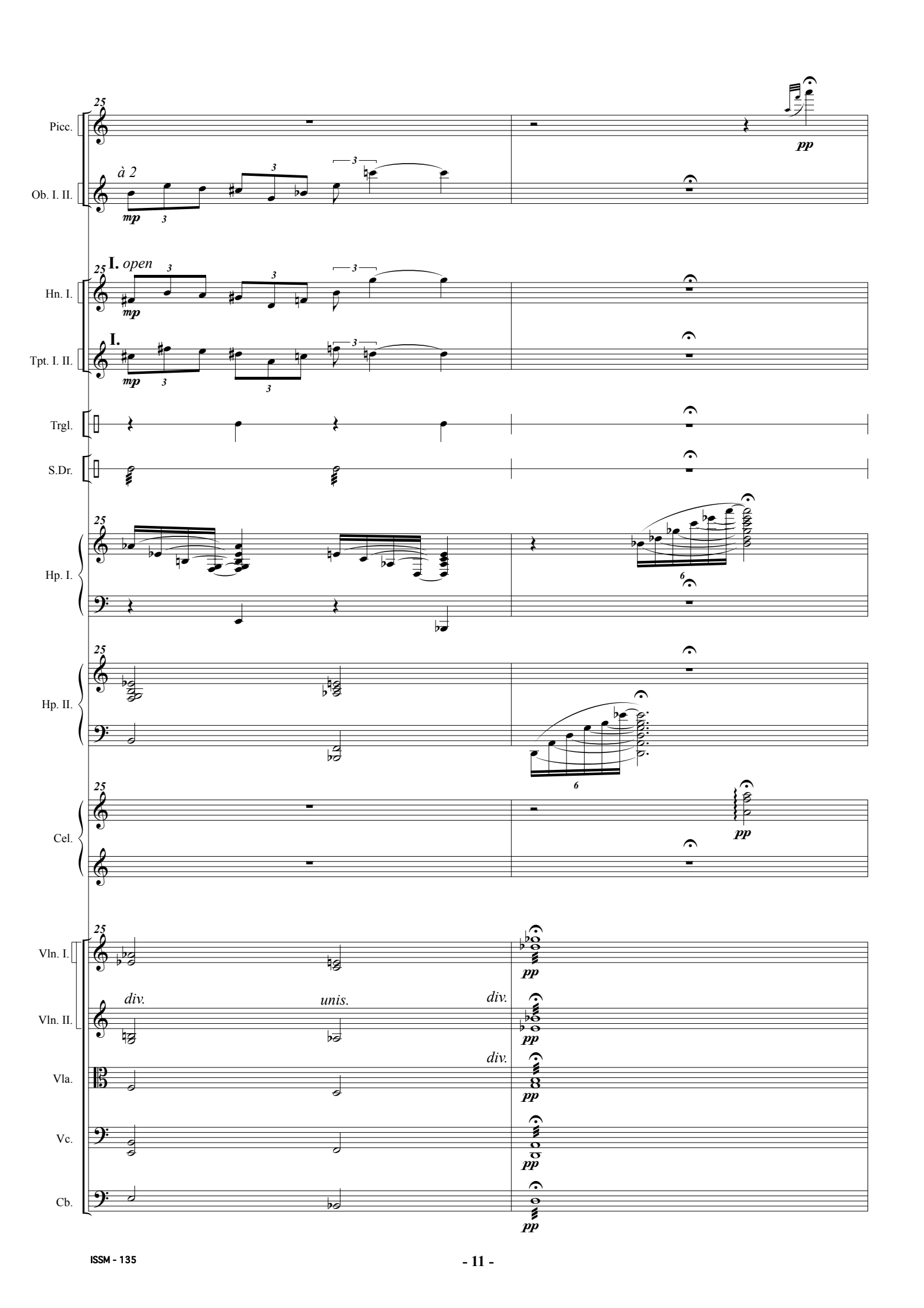

13
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Hn. I. II.
sim.
Hn. III. IV.
sim.
Tpt. I. II.
sim.
B♭ Tpt. III.
sim.
Hp. I.
8va
6
Hp. II.
8va
5
Cel.
p
Vln. I.
tutti
mf
Vln. II.
tutti
mf
Vla.
mf
Vc.
Cb.


à 2
15
Fl. I.II.
p
Picc.
p
à 2
Cl. I. II.
p
15ma
15
Hp. I.
pp
15ma
15
Hp. II.
pp
Speaker
From out there, now 2.7 billion miles away, Pioneer's eight-watt radio transmitter sends faint wessages back to Earth every day, whispers of discovery. The transit time of these reports, traveling at the speed of light, is 4 hours and 16 minutes. And by the time the signals arrive at tracking antennas, they have all but vanished, their strength reduced to 20 billionths of a watt.
Vc.
pp
Cb.
pp

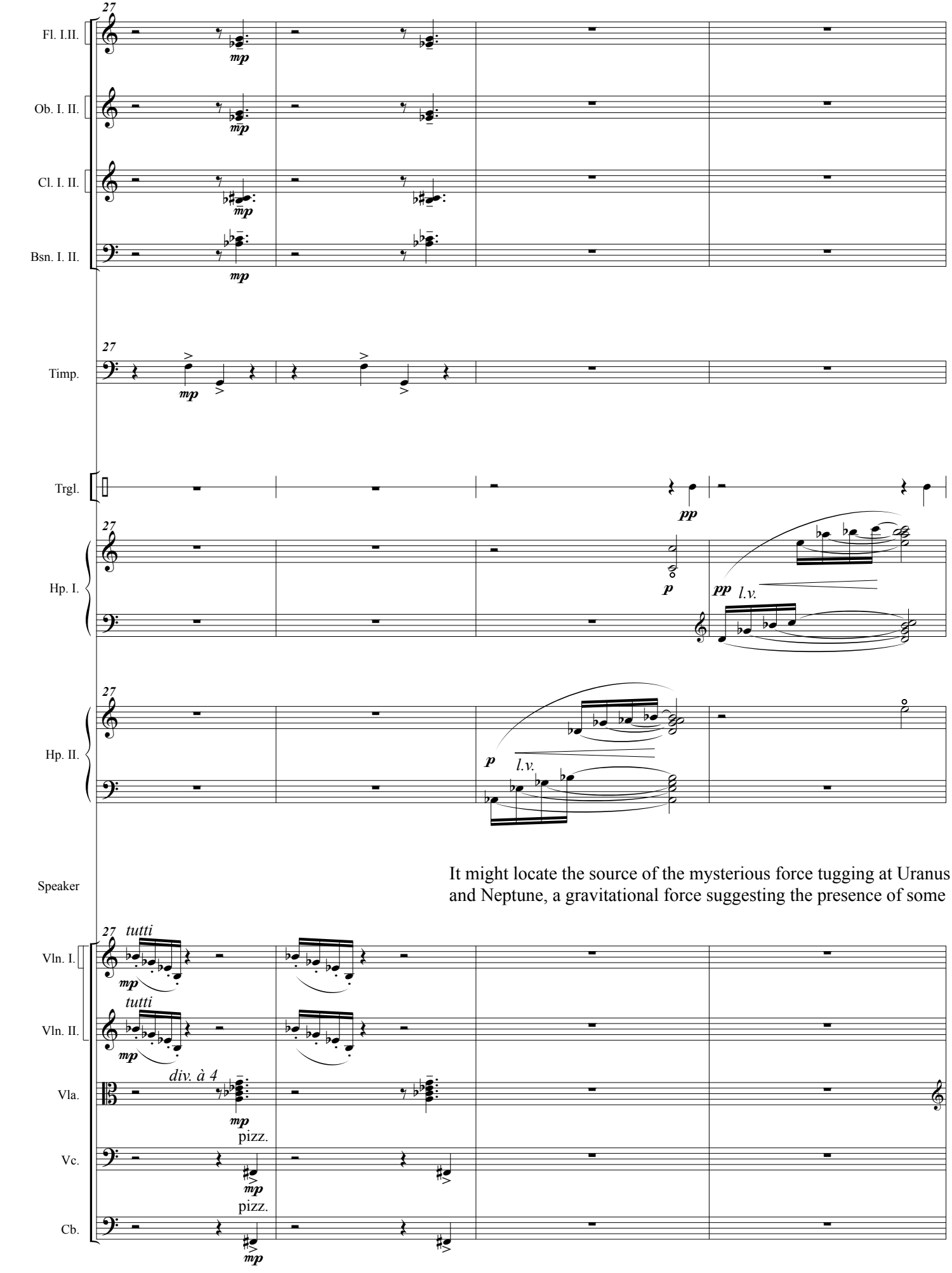

Molto meno mosso
rit.
I.
Fl. I.
Picc.
Hp. I.
Hp. II.
Cel.
Speaker
But scientists with the patience to extract the signals out of the background noise and to decipher their messages are learning for the first time what it is like in the outermost solar system.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
ppp
l.v.
div.

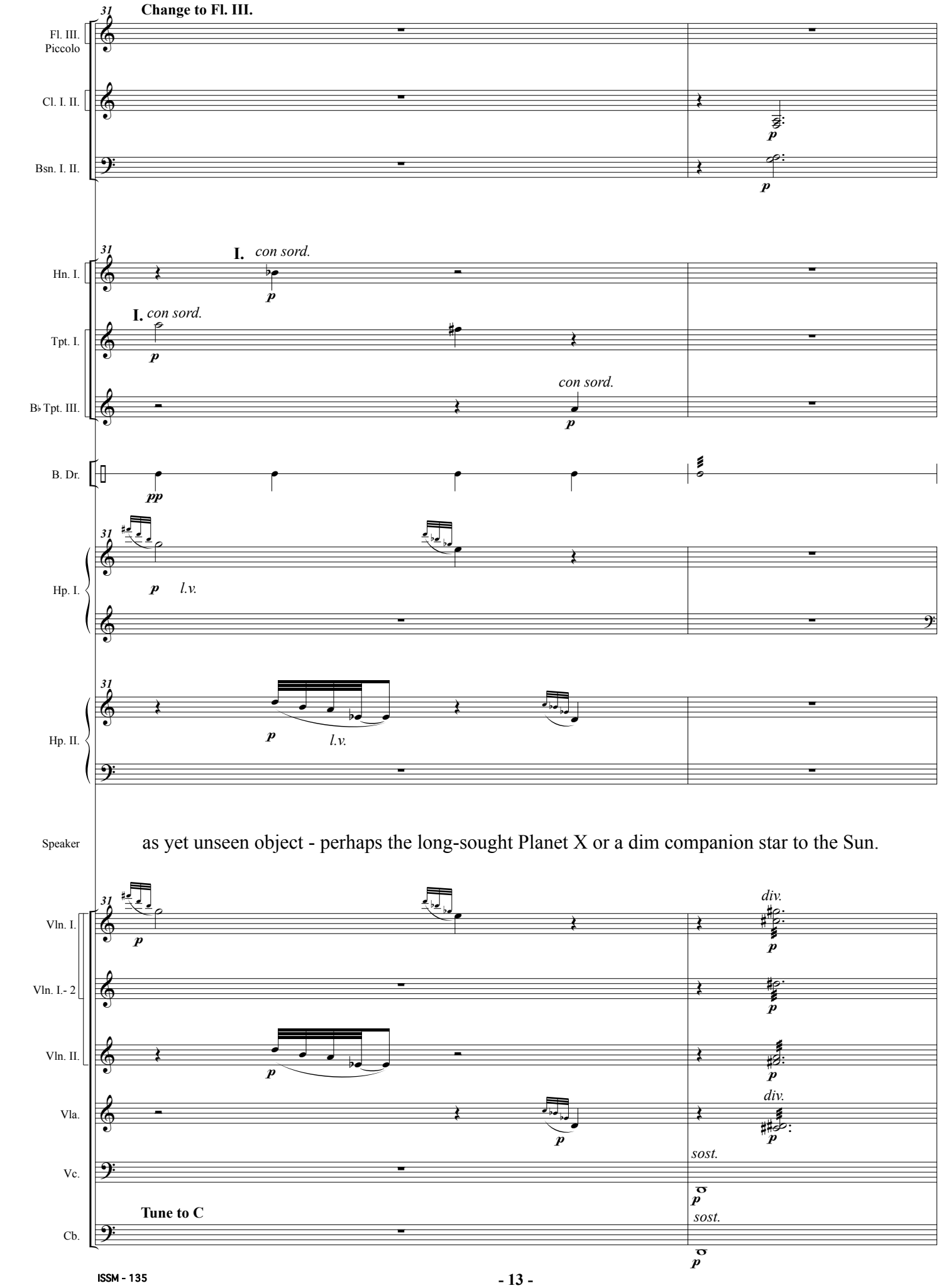

Lento
Repeat under monologue
20
Fl. I.II.
Ob. I. II.
Cl. I. II.
Cl. III.
Hp. I.
Hp. II.
Cel.
Speaker
Vln. I.
Vln. II.
Vla.
ppp
8va
div.
tutti
It is cold and dark and empty, as they knew it must be.
A tenuous wind of solar particles, the
million-mile-an-hour solar wind, still blows outward.
Cosmic rays race inward. A virtual vacuum, it may be,
but nothingness, it seems, is a relative condition.

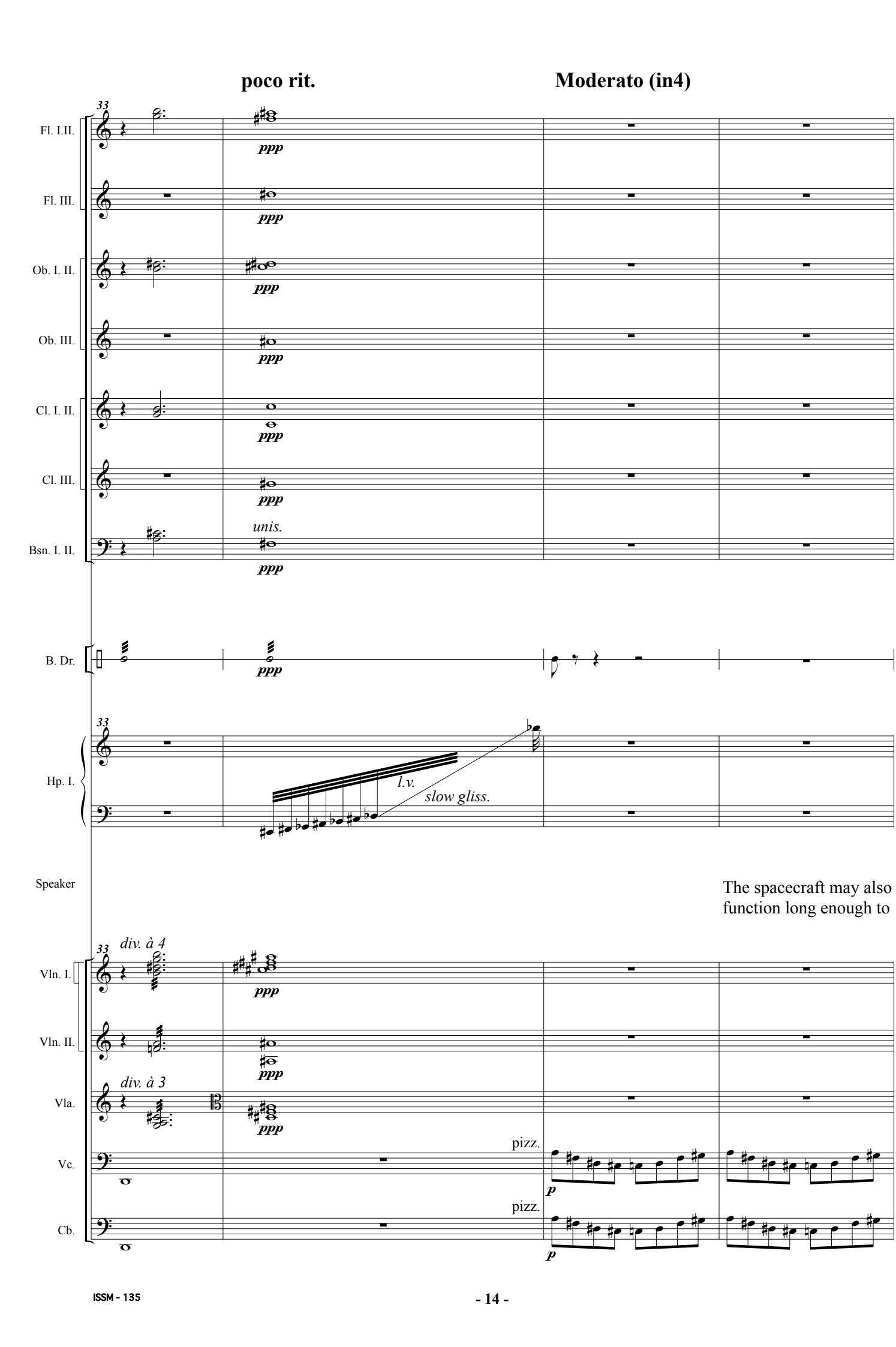

Pesante
23
Trgl.
S.Dr.
Hp. I.
Hp. II.
Speaker
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
pp
mp
sec
div.
tutti
unis.
If the spacecraft survives long enough and the scientists are clever enough, more exciting discoveries could lie ahead for Pioneer 10. It might be able to detect gravity waves, which have been theorized but have never been observed.

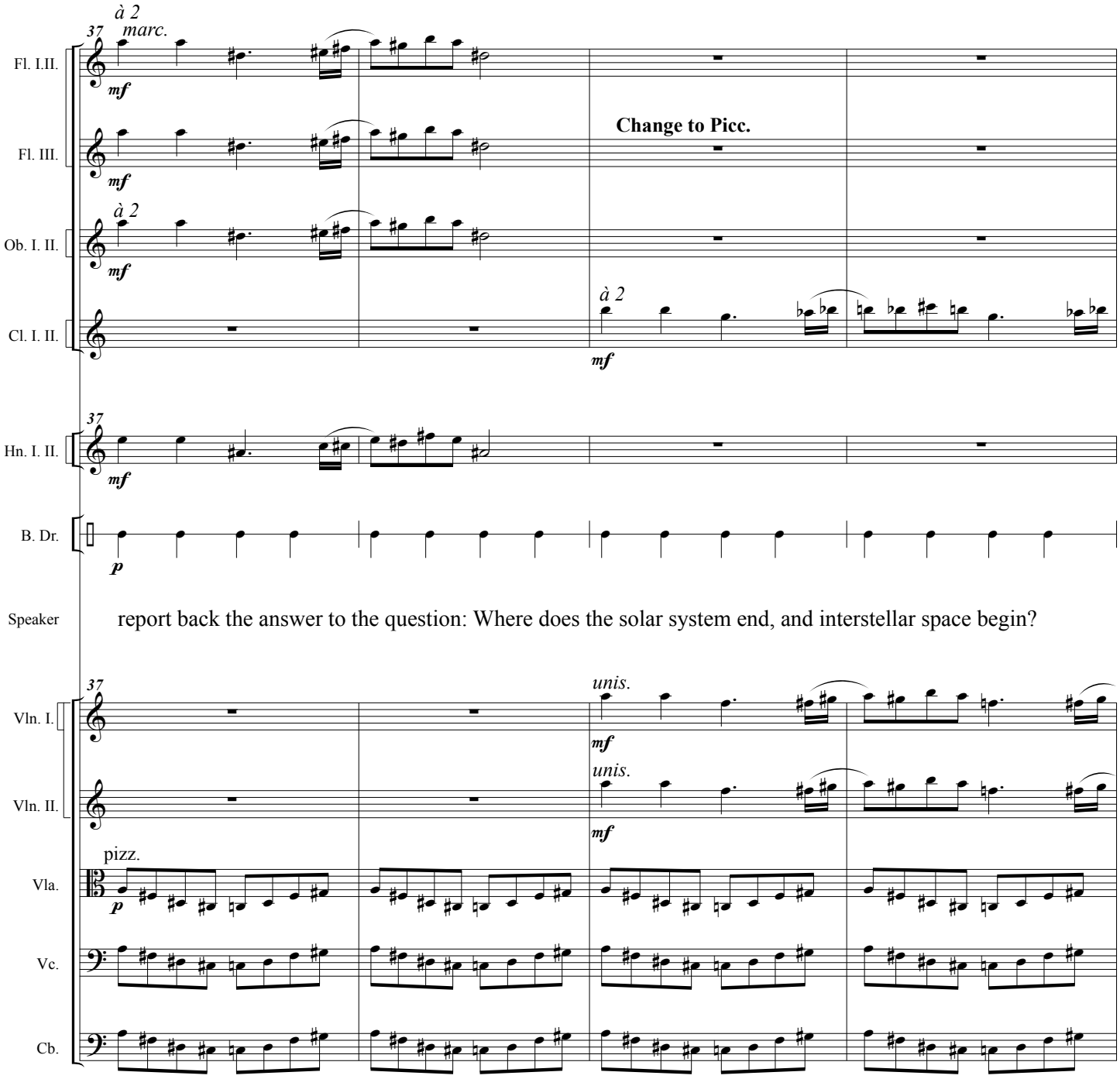

25
Picc.
pp
à 2
Ob. I. II.
mp
I. open
Hn. I.
mp
I.
Tpt. I. II.
mp
Trgl.
S.Dr.
Hp. I.
Hp. II.
Cel.
pp
Vln. I.
Vln. II.
div.
unis.
div.
pp
Vla.
div.
pp
Vc.
pp
Cb.
pp

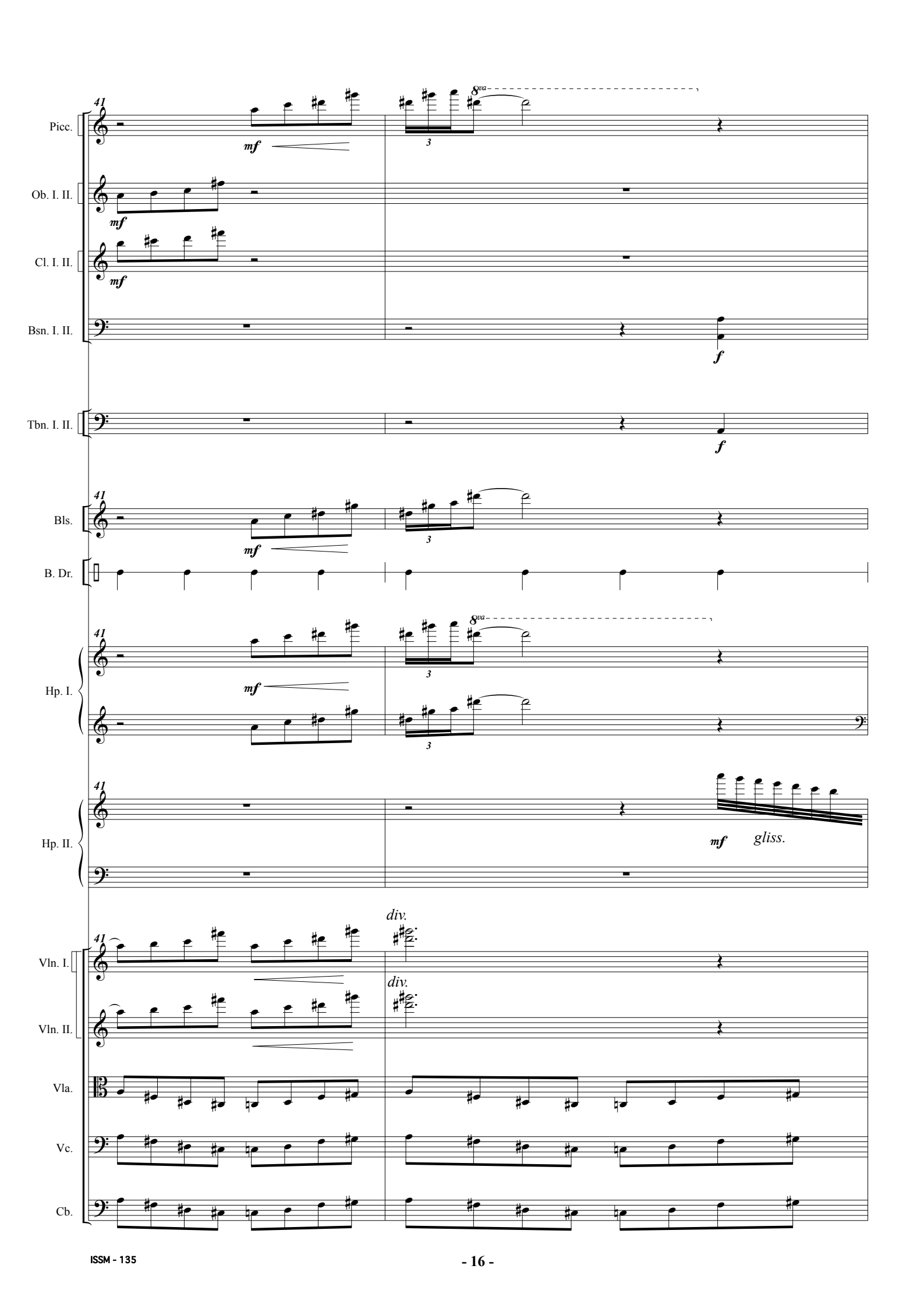
Marziale (4 to the measure)

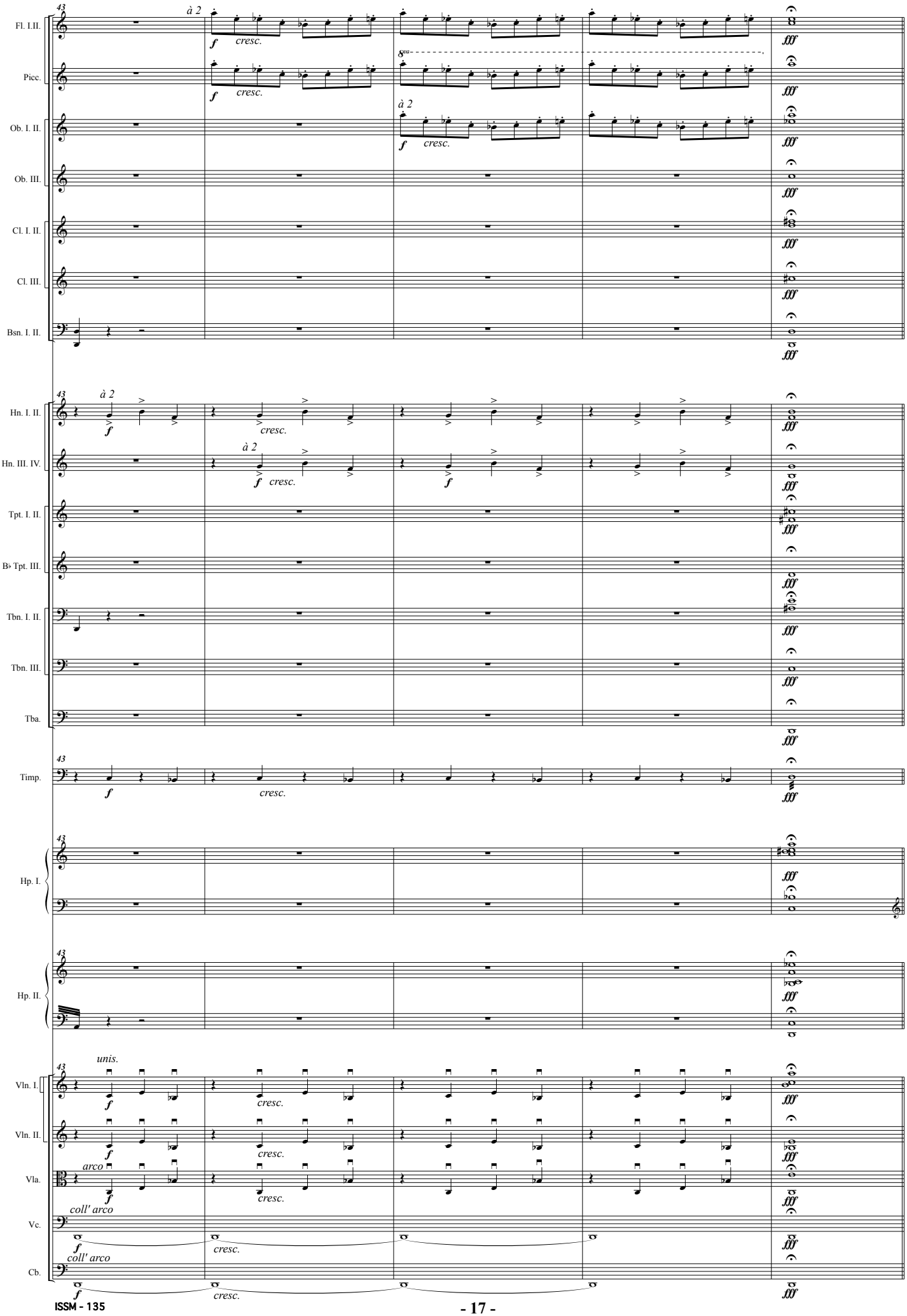


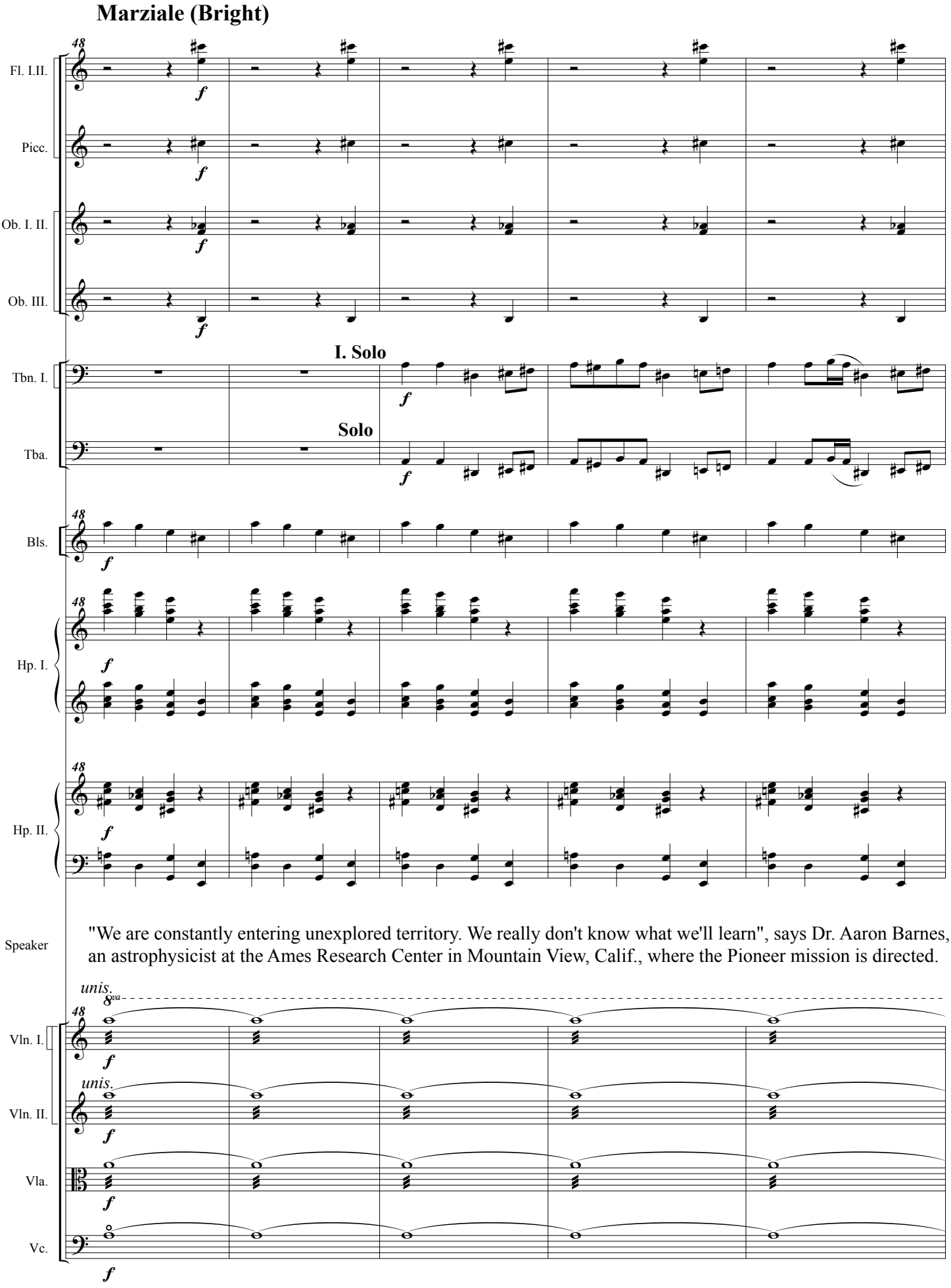

31
Change to Fl. III.
Fl. III.
Piccolo
Cl. I. II.
Bsn. I. II.
Hn. I.
I. con sord.
Tpt. I.
I. con sord.
B♭ Tpt. III.
con sord.
B. Dr.
Hp. I.
l.v.
Hp. II.
l.v.
Speaker
as yet unseen object - perhaps the long-sought Planet X or a dim companion star to the Sun.
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
Cb.
div.
div.
sost.
sost.
Tune to C

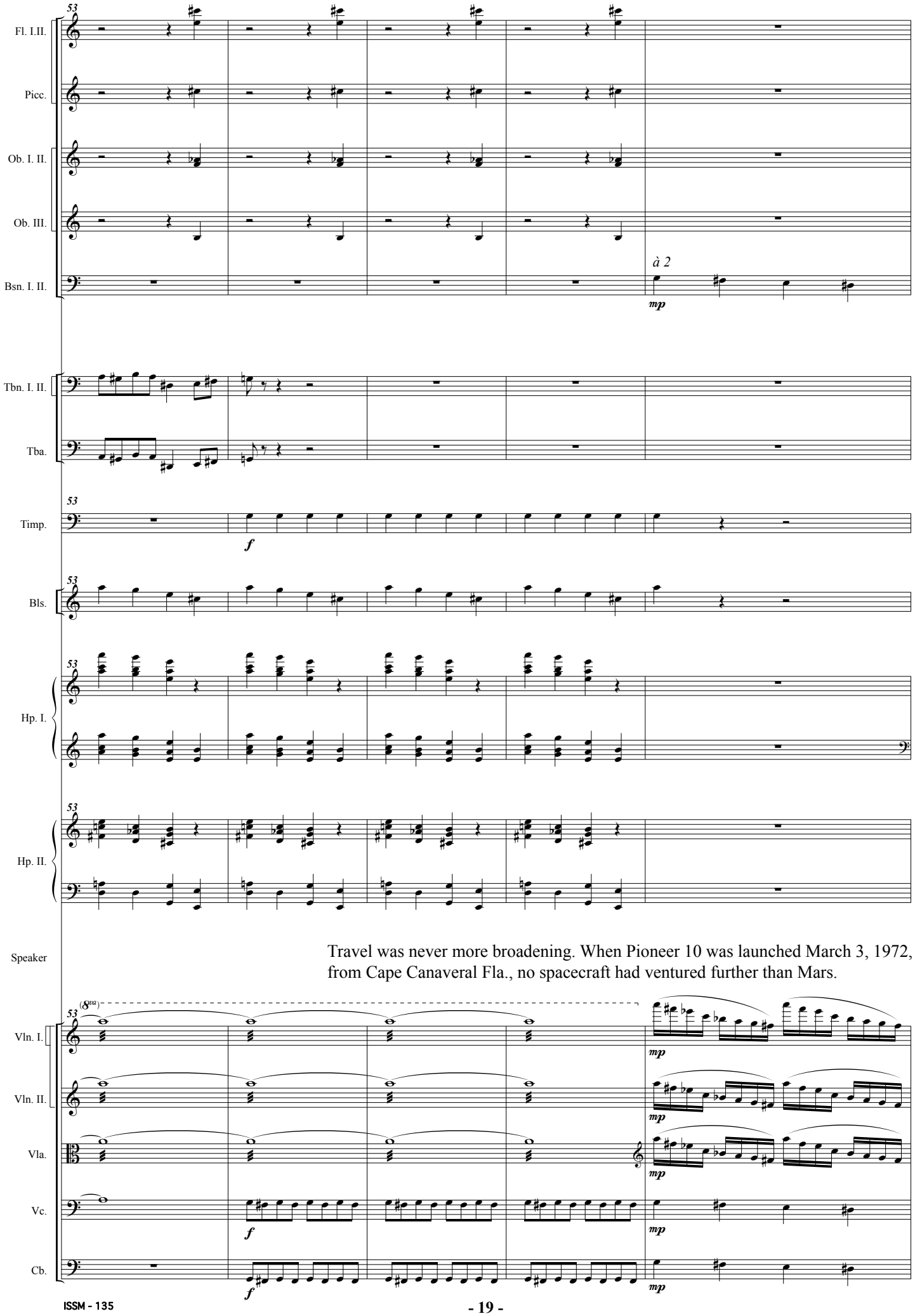

poco rit.
Moderato (in4)
33
Fl. I.II.
Fl. III.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
unis.
ppp
B. Dr.
Hp. I.
l.v.
slow gliss.
Speaker
The spacecraft may also
function long enough to
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
div. à 4
div. à 3
pizz.
p

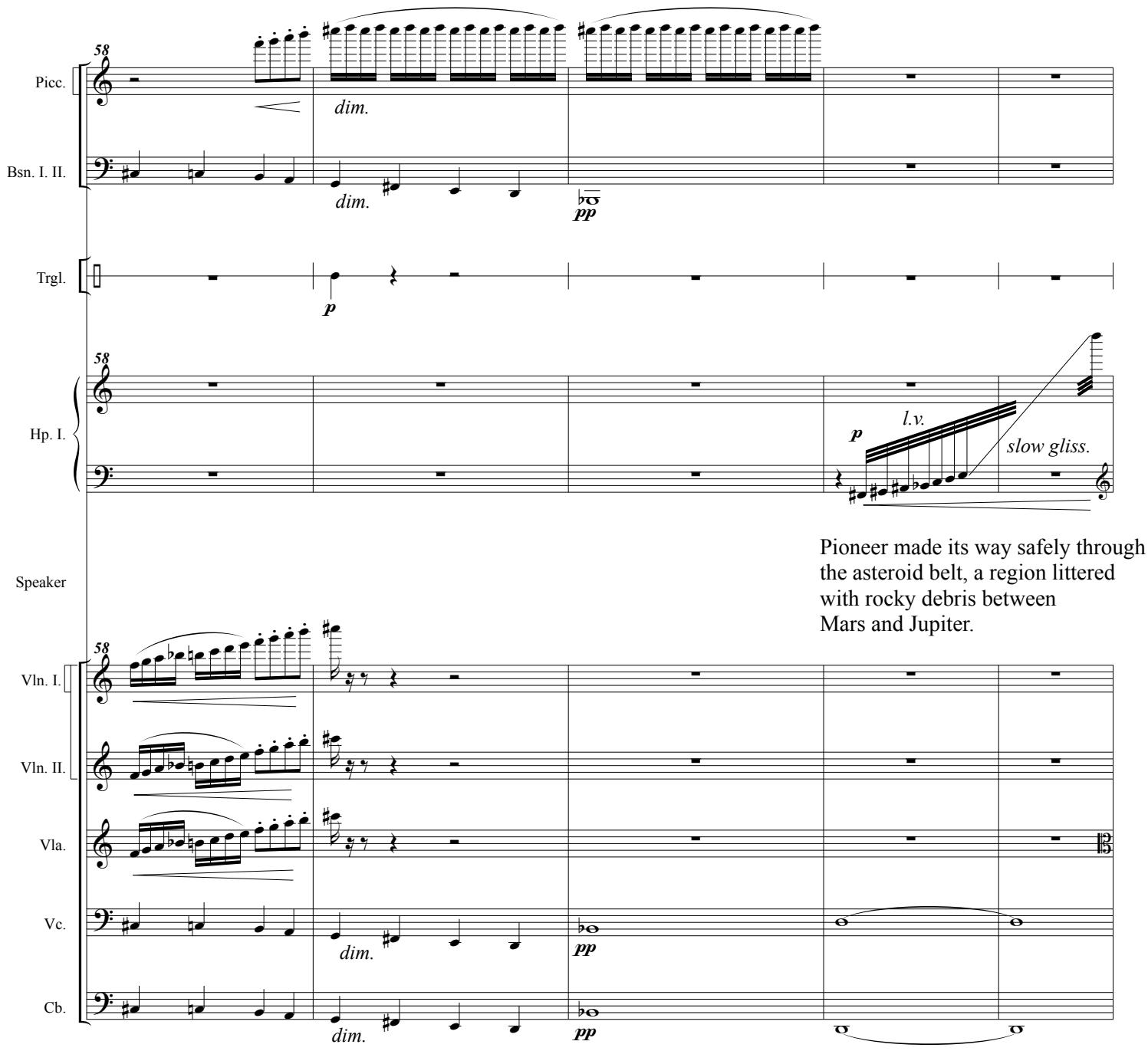

37
à 2
marc.
Fl. I.II.
mf
Fl. III.
Change to Picc.
Ob. I. II.
Cl. I. II.
à 2
Hn. I. II.
B. Dr.
p
Speaker
report back the answer to the question: Where does the solar system end, and interstellar space begin?
unis.
Vln. I.
Vln. II.
pizz.
Vla.
Vc.
Cb.

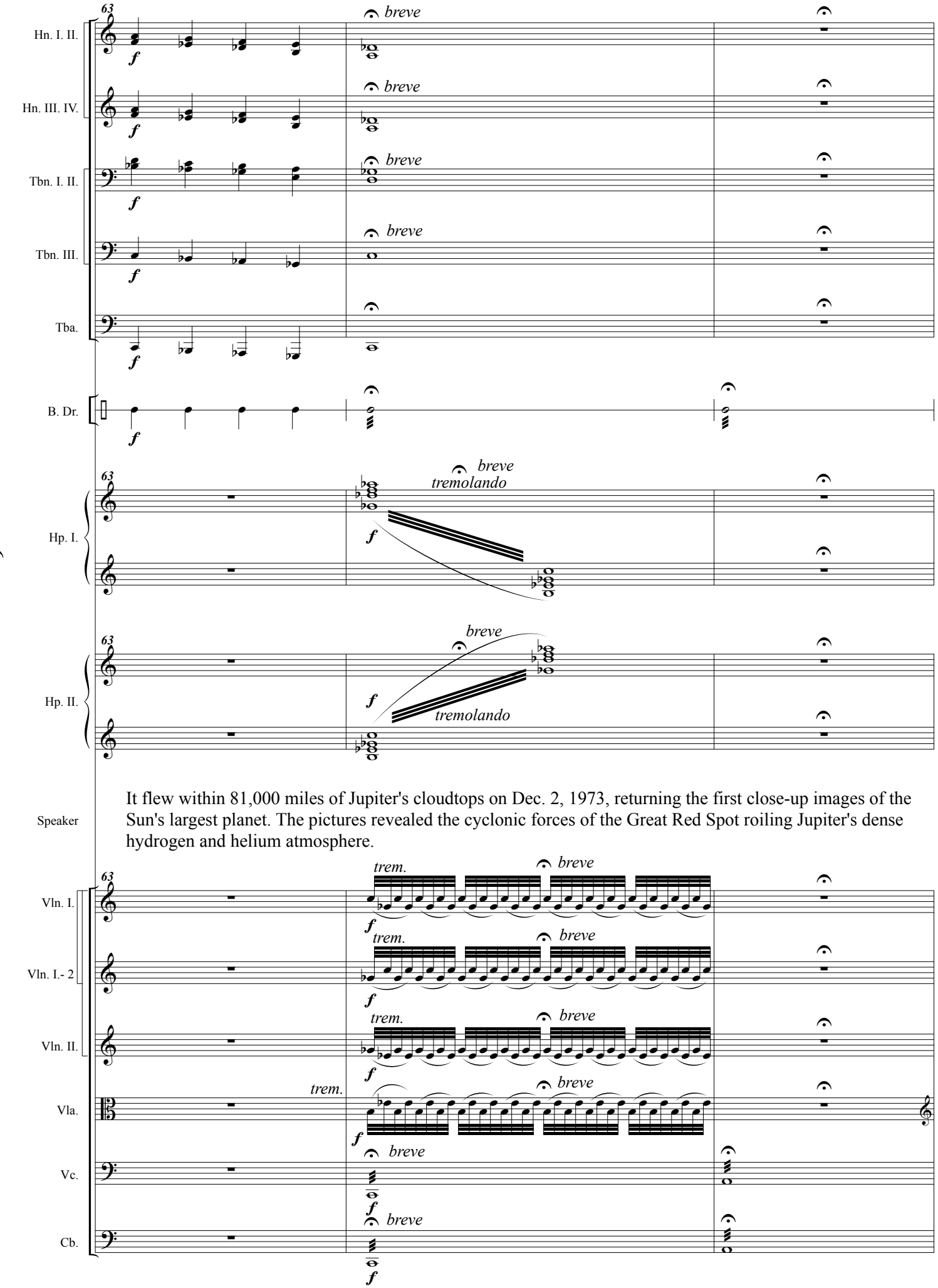

41
Picc.
mf
8va
3
Ob. I. II.
mf
Cl. I. II.
mf
Bsn. I. II.
f
Tbn. I. II.
f
41
Bls.
mf
3
B. Dr.
41
Hp. I.
mf
8va
3
41
Hp. II.
mf
gliss.
41
Vln. I.
div.
Vln. II.
div.
Vla.
Vc.
Cb.


43
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I. II.
Tbn. III.
Tba.
Timp.
Hp. I.
Hp. II.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
à 2
unis.
arco
coll' arco
f
cresc.
fff


Marziale (Bright)
48
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
I. Solo
Tbn. I.
Solo
Tba.
Bls.
Hp. I.
Hp. II.
Speaker
"We are constantly entering unexplored territory. We really don't know what we'll learn", says Dr. Aaron Barnes, an astrophysicist at the Ames Research Center in Mountain View, Calif., where the Pioneer mission is directed.
unis.
8va
Vln. I.
unis.
Vln. II.
Vla.
Vc.

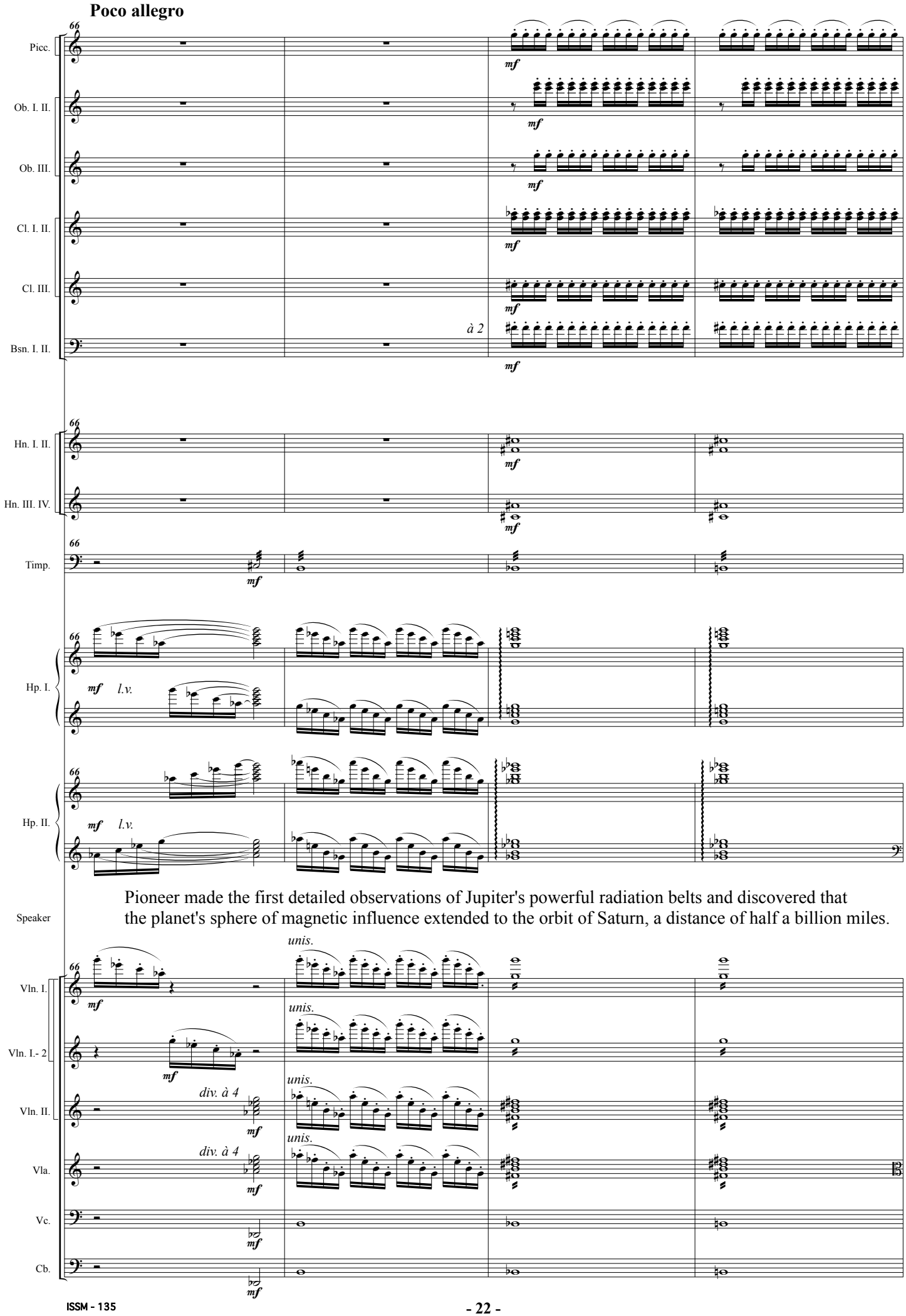

53
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Bsn. I. II.
à 2
mp
Tbn. I. II.
Tba.
53
Timp.
f
53
Bls.
53
Hp. I.
53
Hp. II.
Speaker
Travel was never more broadening. When Pioneer 10 was launched March 3, 1972, from Cape Canaveral Fla., no spacecraft had ventured further than Mars.
53
(8va)
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
f
mp

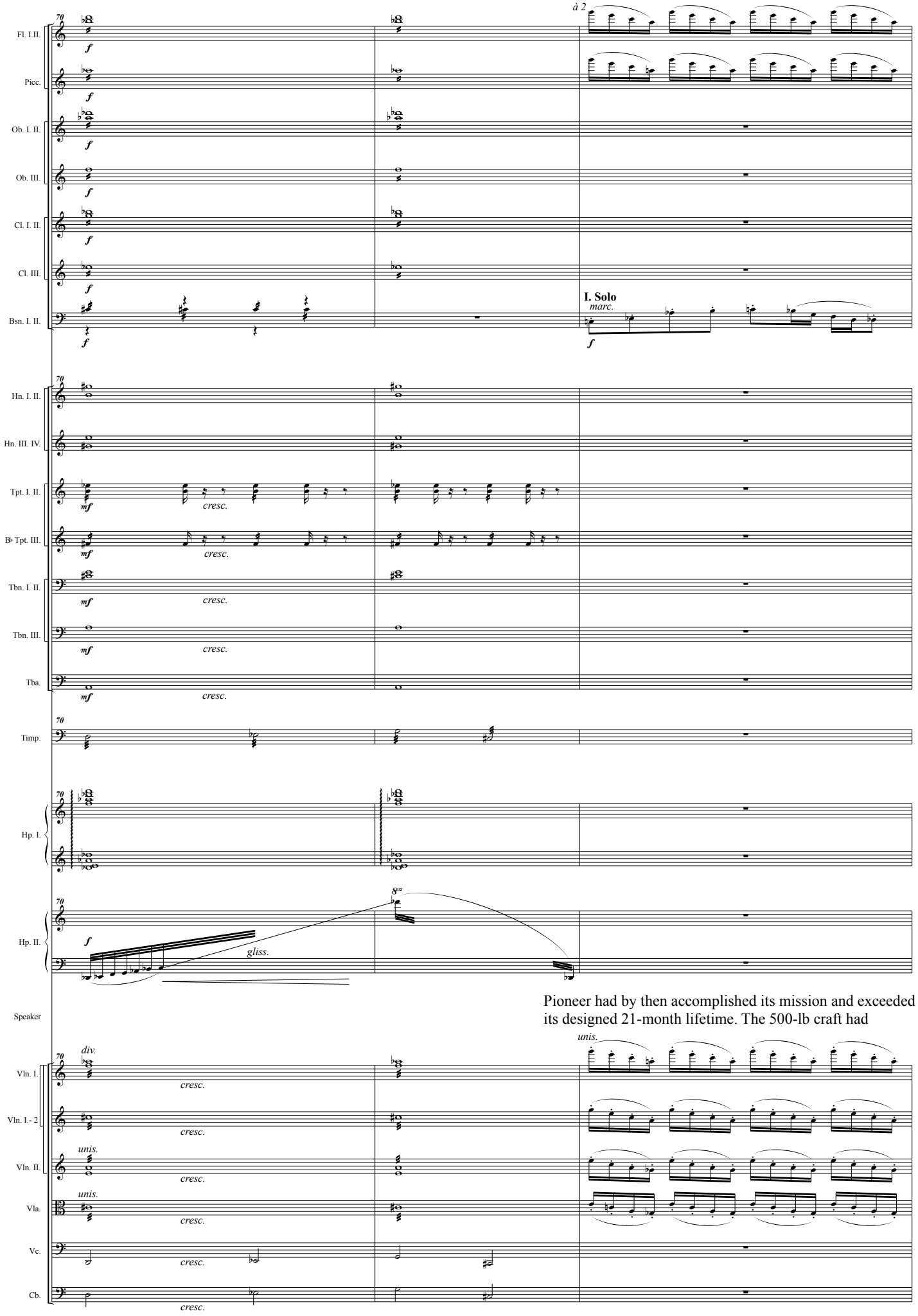

58
Picc.
dim.
Bsn. I. II.
dim.
pp
Trgl.
p
58
Hp. I.
p
l.v.
slow gliss.
Speaker
Pioneer made its way safely through the asteroid belt, a region littered with rocky debris between Mars and Jupiter.
58
Vln. I.
Vln. II.
Vla.
Vc.
dim.
pp
Cb.
dim.
pp

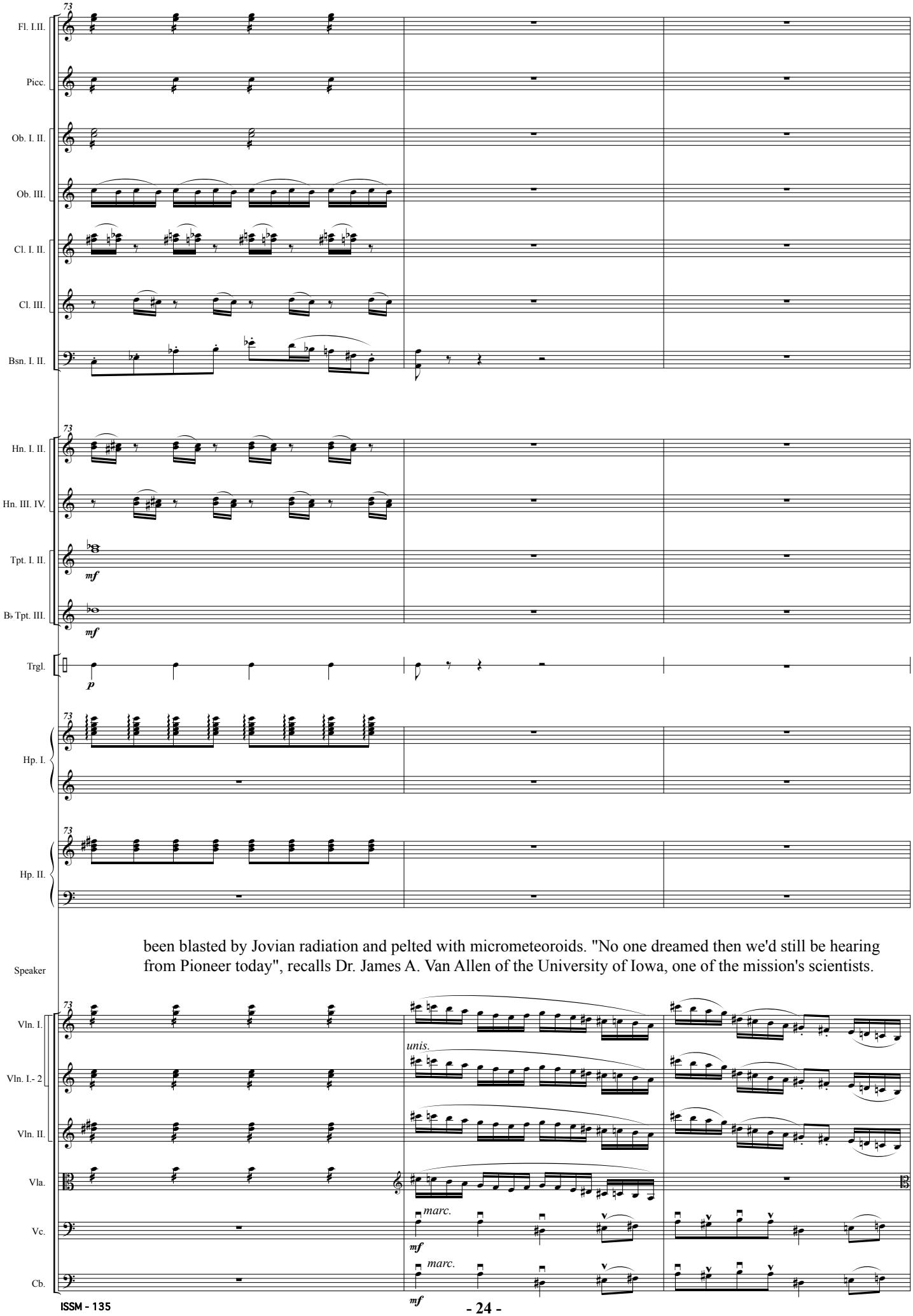


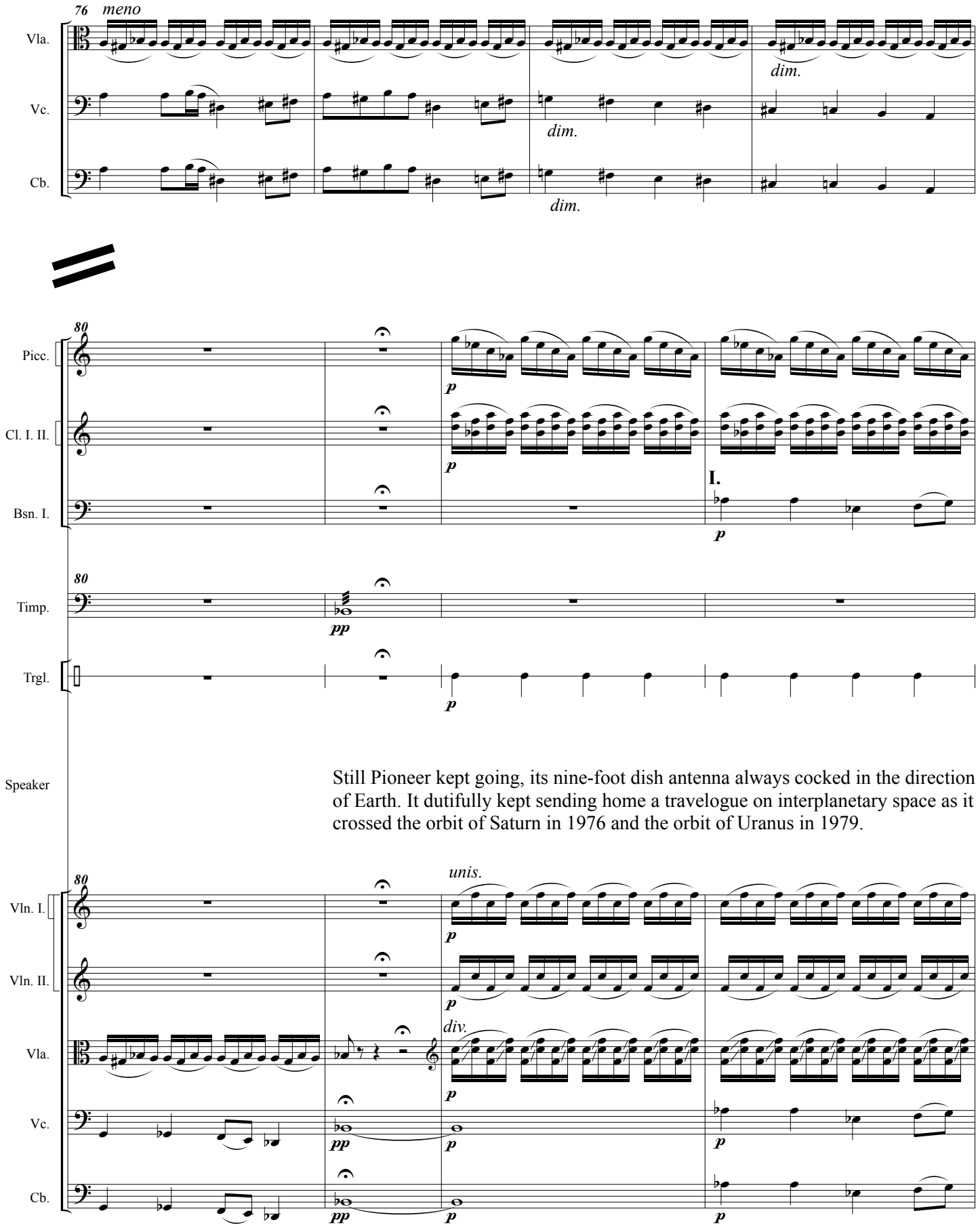
Speaker

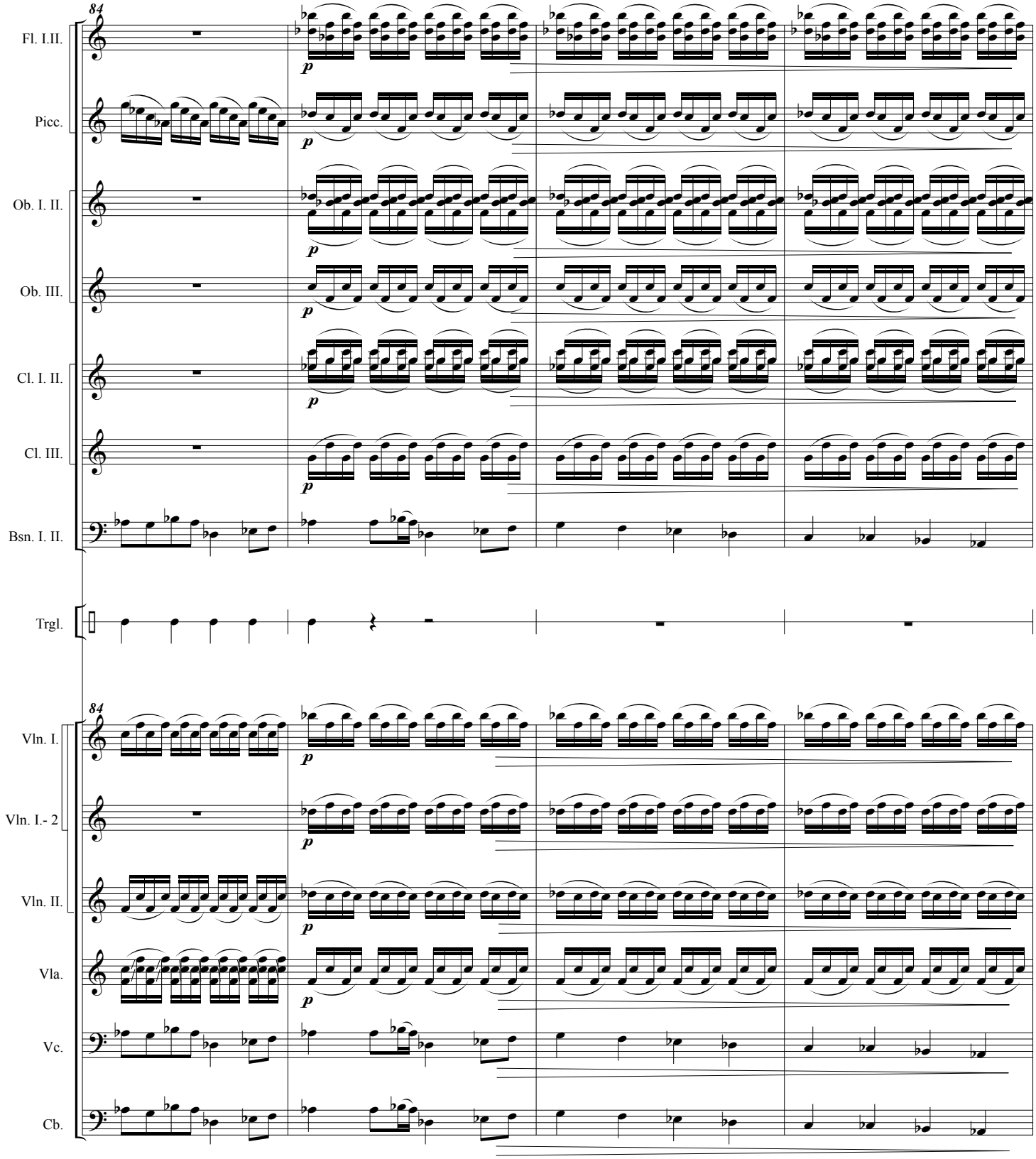
It flew within 81,000 miles of Jupiter's cloudtops on Dec. 2, 1973, returning the first close-up images of the Sun's largest planet. The pictures revealed the cyclonic forces of the Great Red Spot roiling Jupiter's dense hydrogen and helium atmosphere.

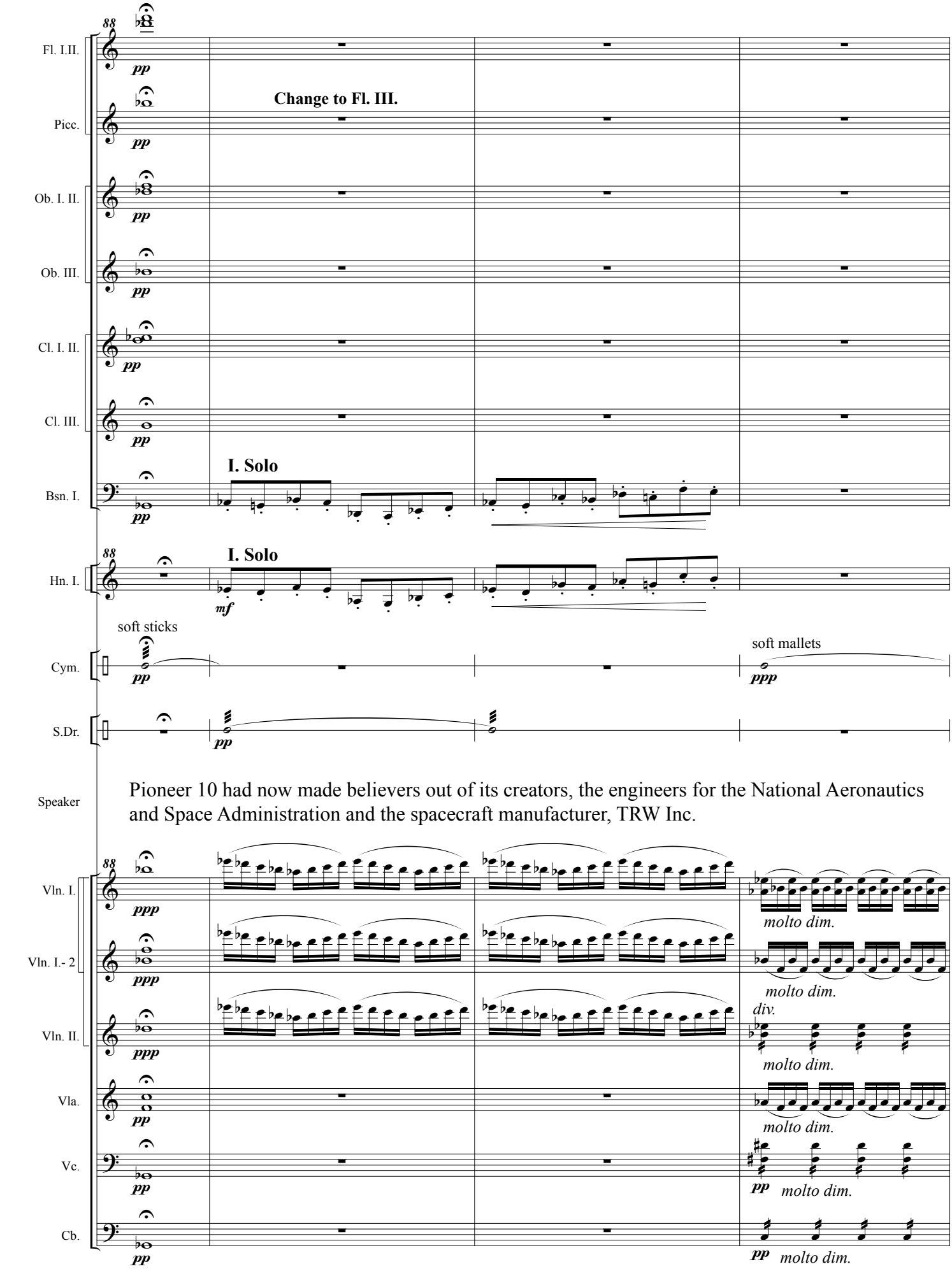

Poco allegro
66
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
à 2
mf
Hn. I. II.
Hn. III. IV.
Timp.
Hp. I.
Hp. II.
l.v.
Speaker
Pioneer made the first detailed observations of Jupiter's powerful radiation belts and discovered that
the planet's sphere of magnetic influence extended to the orbit of Saturn, a distance of half a billion miles.
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
Cb.
unis.
div. à 4

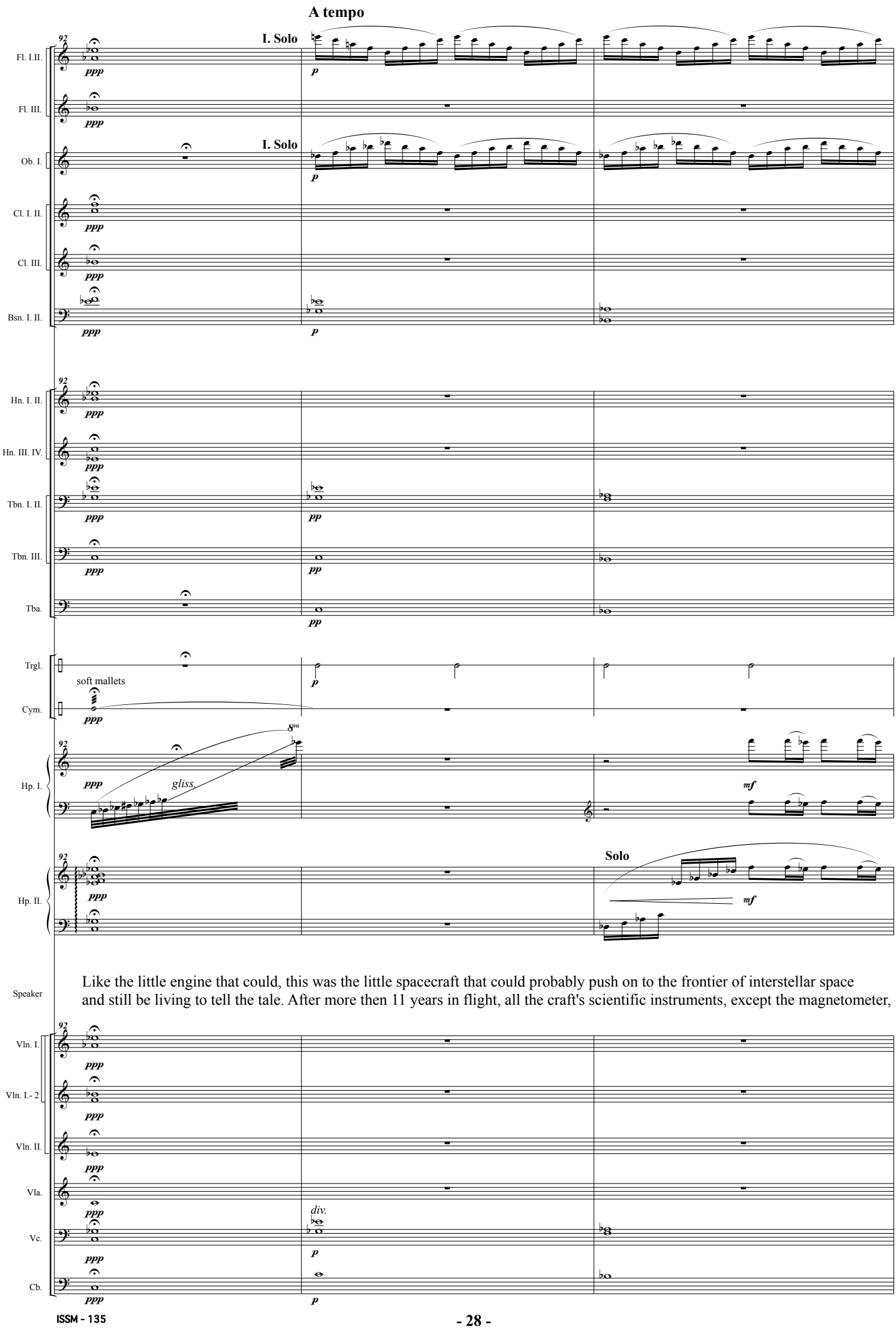

à 2
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
I. Solo
marc.
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I. II.
Tbn. III.
Tba.
cresc.
Timp.
Hp. I.
Hp. II.
gliss.
Speaker
Pioneer had by then accomplished its mission and exceeded its designed 21-month lifetime. The 500-lb craft had
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
Cb.
div.
unis.

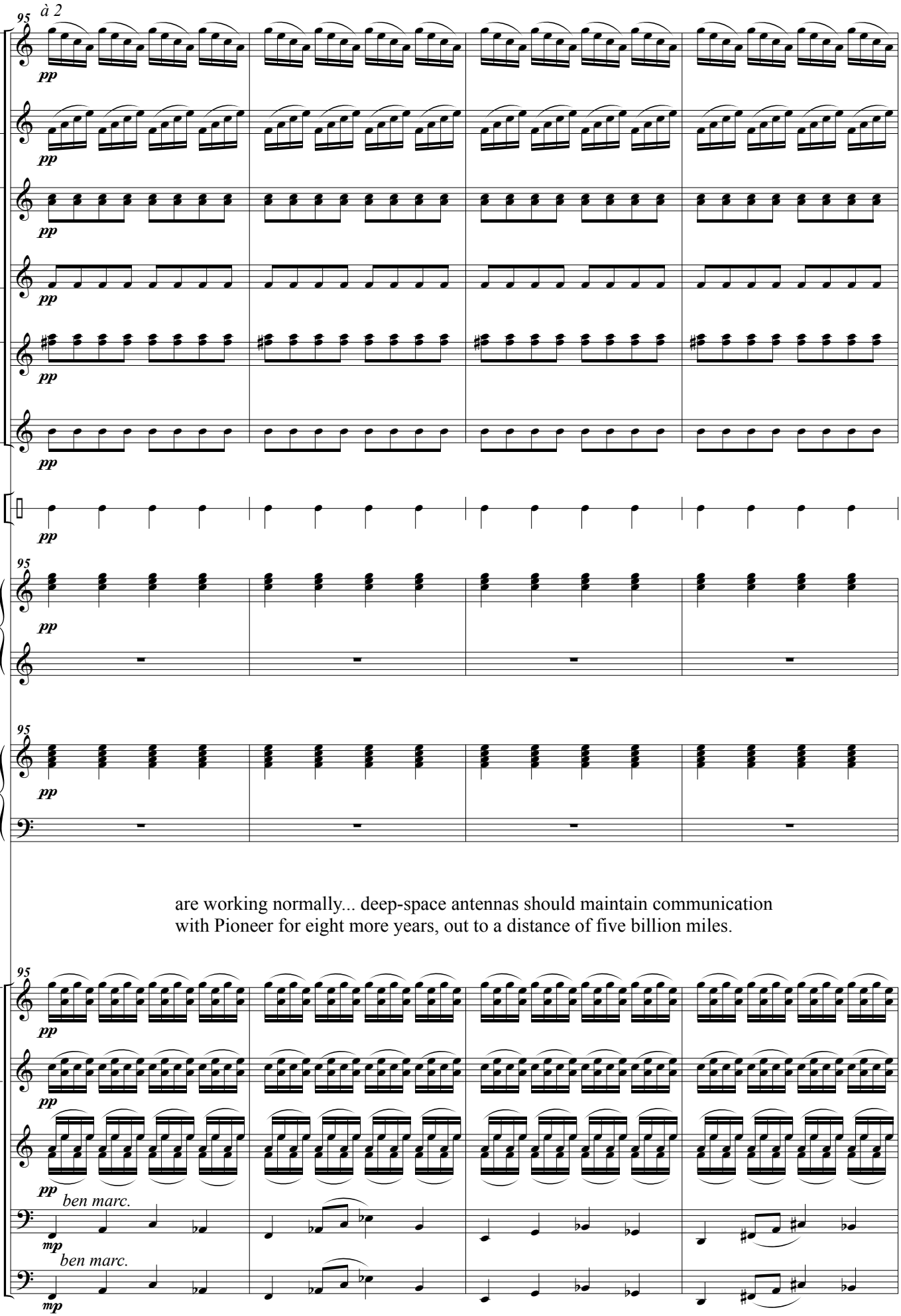

73
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
mf
B♭ Tpt. III.
mf
Trgl.
p
Hp. I.
Hp. II.
been blasted by Jovian radiation and pelted with micrometeoroids. "No one dreamed then we'd still be hearing from Pioneer today", recalls Dr. James A. Van Allen of the University of Iowa, one of the mission's scientists.
Speaker
Vln. I.
unis.
Vln. I.- 2
Vln. II.
Vla.
Vc.
marc.
mf
Cb.
marc.
mf

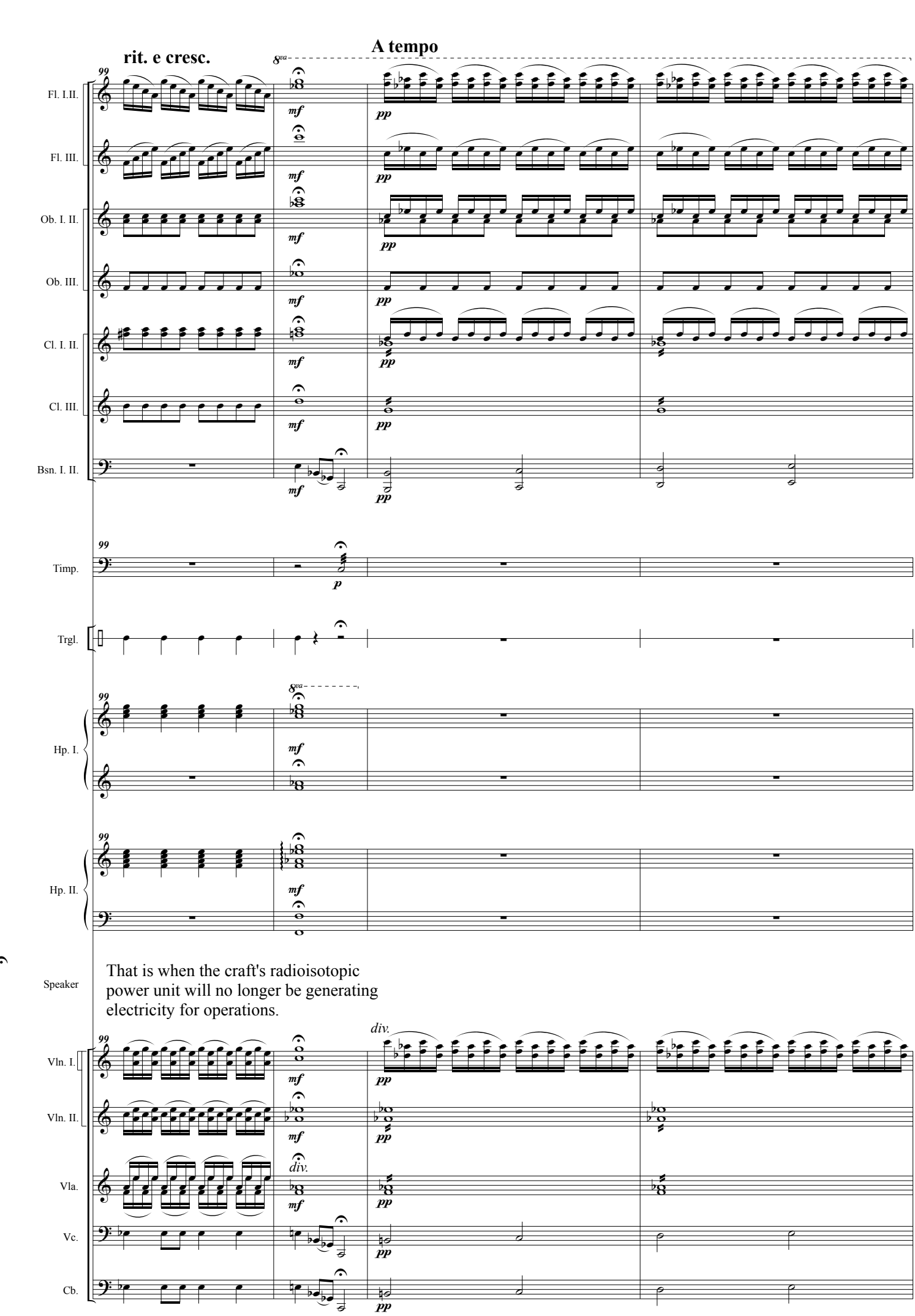

76 meno
Vla.
Vc.
Cb.
dim.
dim.
dim.
80
Picc.
Cl. I. II.
Bsn. I.
I.
Timp.
Trgl.
Speaker
Still Pioneer kept going, its nine-foot dish antenna always cocked in the direction of Earth. It dutifully kept sending home a travelogue on interplanetary space as it crossed the orbit of Saturn in 1976 and the orbit of Uranus in 1979.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
unis.
div.


84
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Trgl.
84
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
Cb.
p

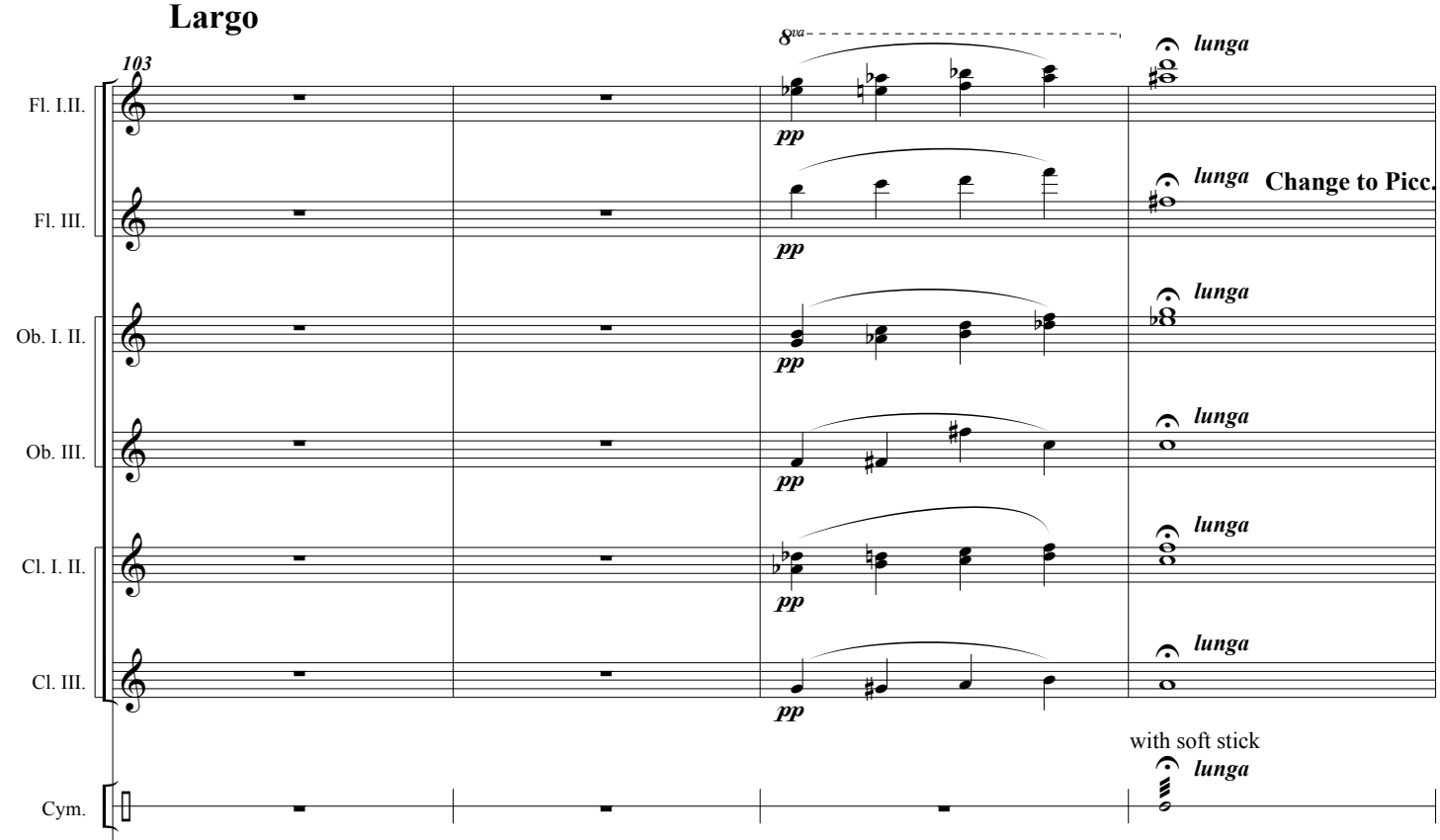

88
Fl. I.II.
pp
Change to Fl. III.
Picc.
pp
Ob. I. II.
pp
Ob. III.
pp
Cl. I. II.
pp
Cl. III.
pp
I. Solo
Bsn. I.
pp
88
I. Solo
Hn. I.
mf
soft sticks
Cym.
pp
soft mallets
ppp
S.Dr.
pp
Speaker
Pioneer 10 had now made believers out of its creators, the engineers for the National Aeronautics and Space Administration and the spacecraft manufacturer, TRW Inc.
88
Vln. I.
ppp
molto dim.
Vln. I.- 2
ppp
molto dim.
div.
Vln. II.
ppp
molto dim.
Vla.
pp
molto dim.
Vc.
pp
pp
molto dim.
Cb.
pp
pp
molto dim.


A tempo
I. Solo
I. Solo
Fl. I.II.
Fl. III.
Ob. I.
Cl. I. II.
Cl. III.
Bsn. I. II.
Hn. I. II.
Hn. III. IV.
Tbn. I. II.
Tbn. III.
Tba.
Trgl.
soft mallets
Cym.
Hp. I.
gliss.
Hp. II.
Solo
Speaker
Like the little engine that could, this was the little spacecraft that could probably push on to the frontier of interstellar space and still be living to tell the tale. After more then 11 years in flight, all the craft's scientific instruments, except the magnetometer,
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
Cb.
div.


95
à 2
Fl. I.II.
Fl. III.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Trgl.
Hp. I.
Hp. II.
Speaker
are working normally... deep-space antennas should maintain communication
with Pioneer for eight more years, out to a distance of five billion miles.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
pp
mp
ben marc.

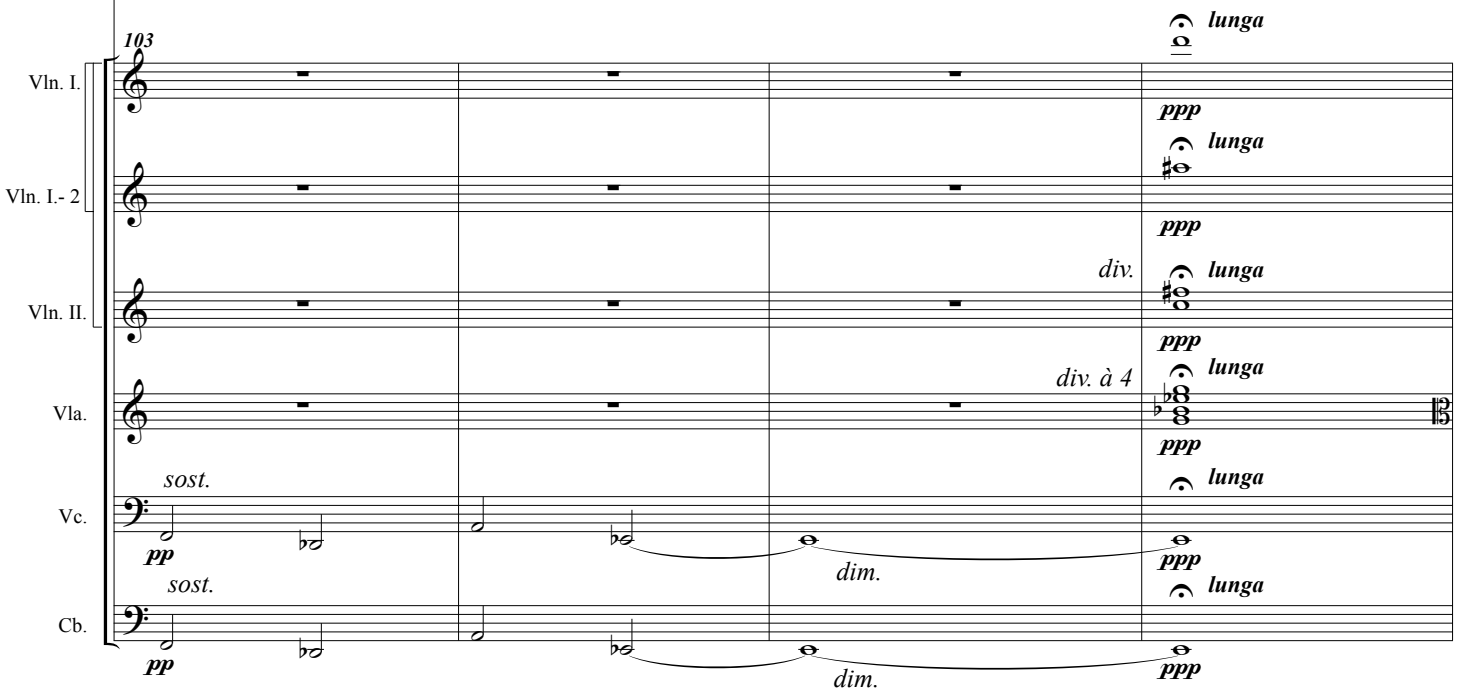

rit. e cresc.
A tempo
Fl. I.II.
Fl. III.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Timp.
Trgl.
Hp. I.
Hp. II.
Speaker
That is when the craft's radioisotopic power unit will no longer be generating electricity for operations.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
div.

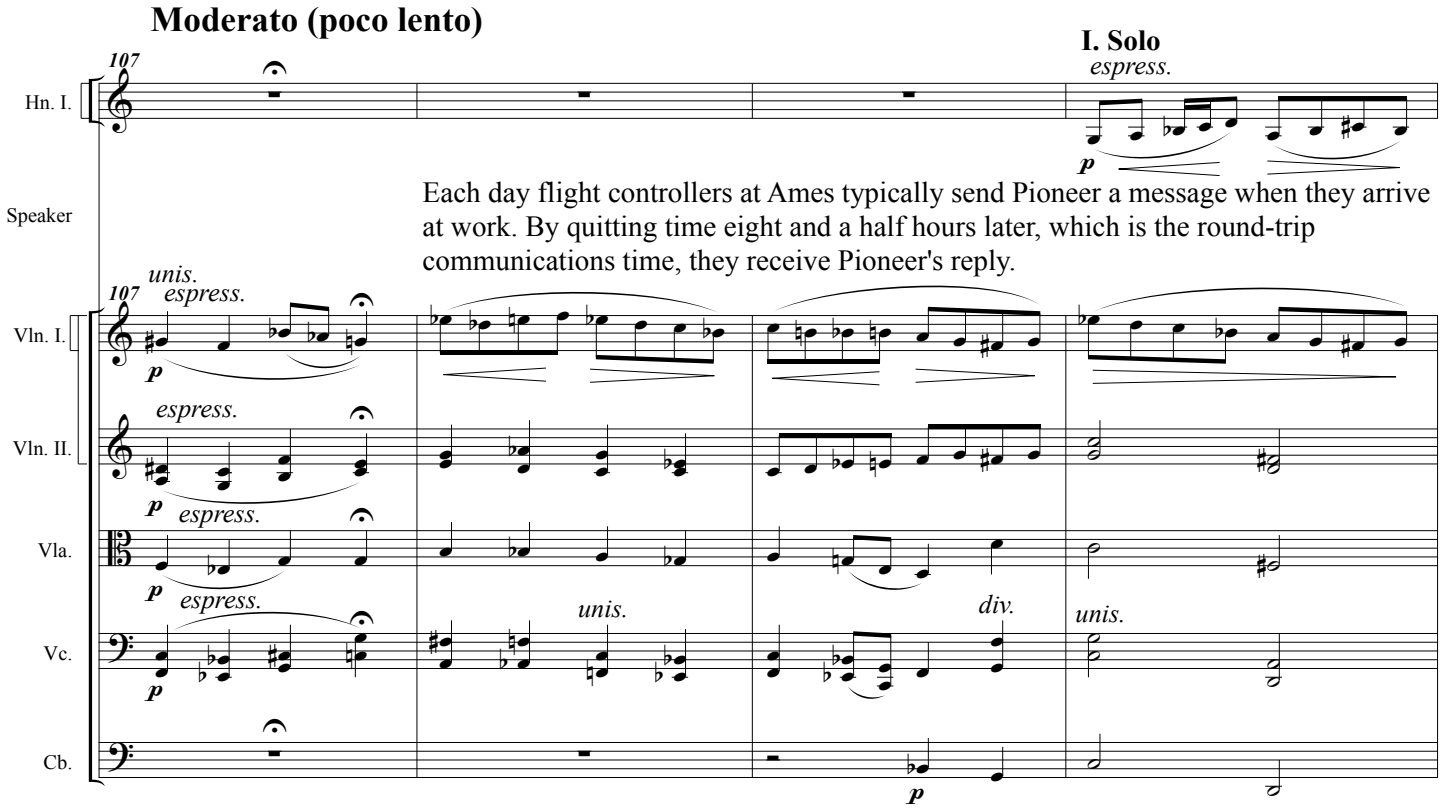
Largo

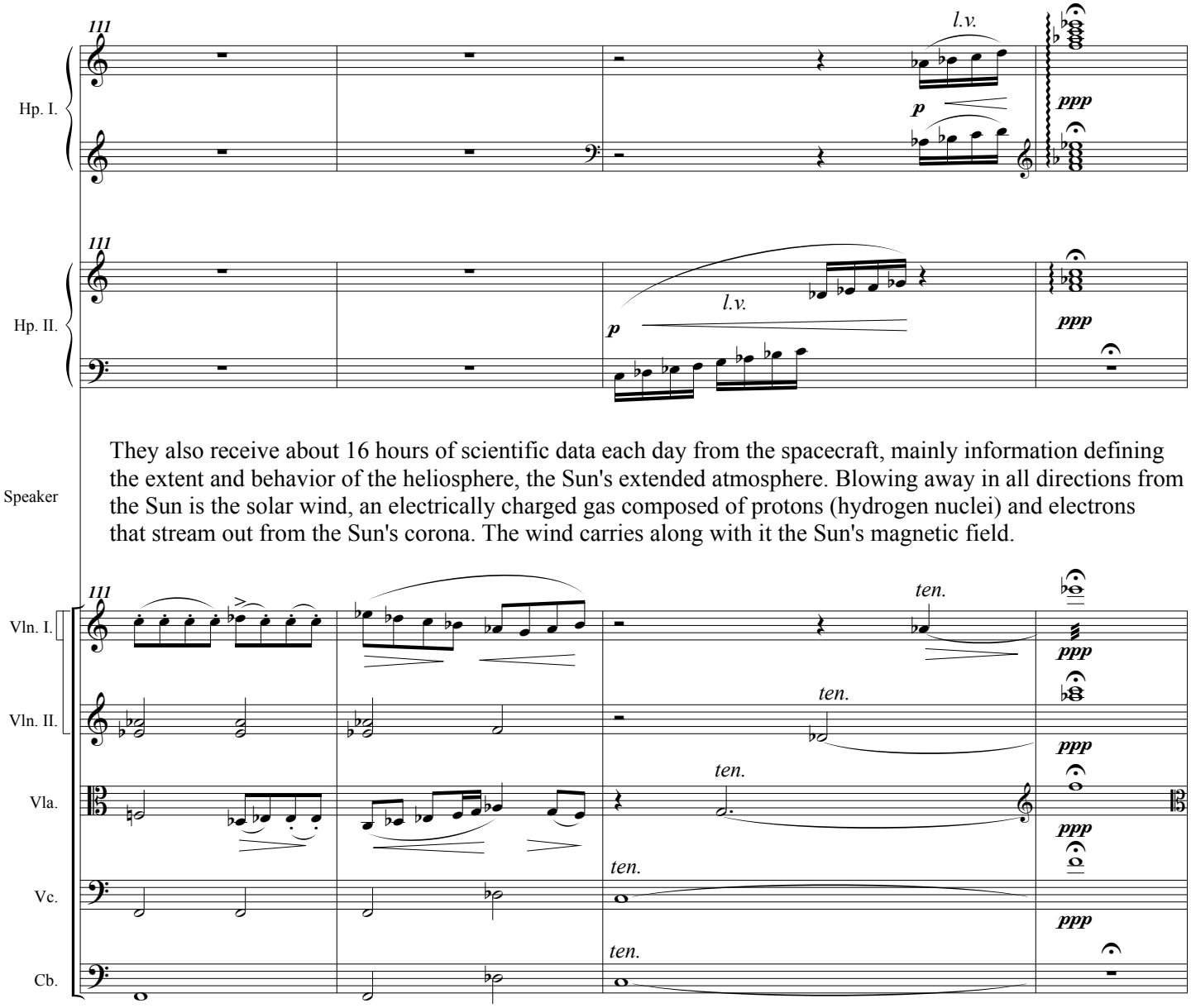


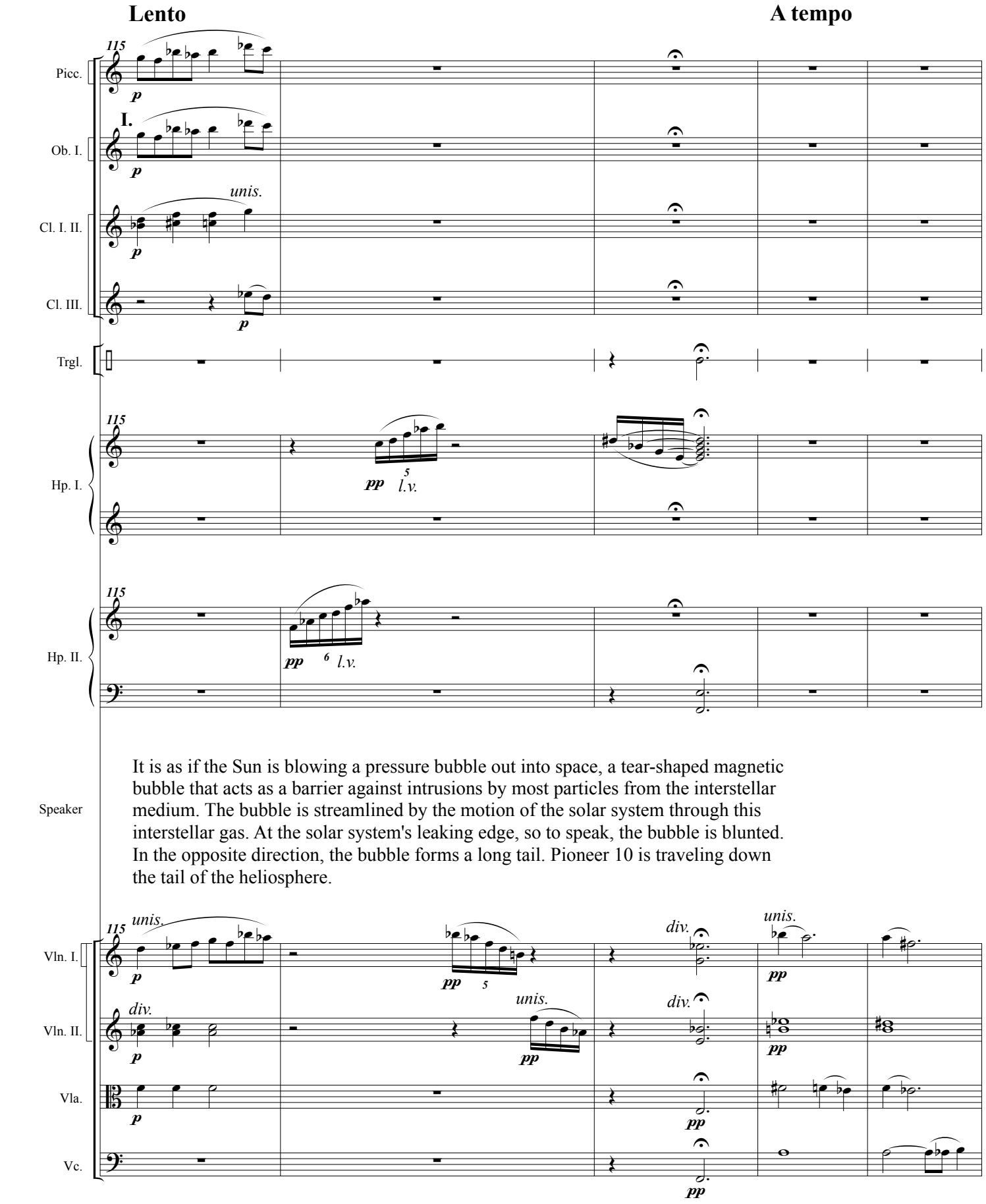
Speaker

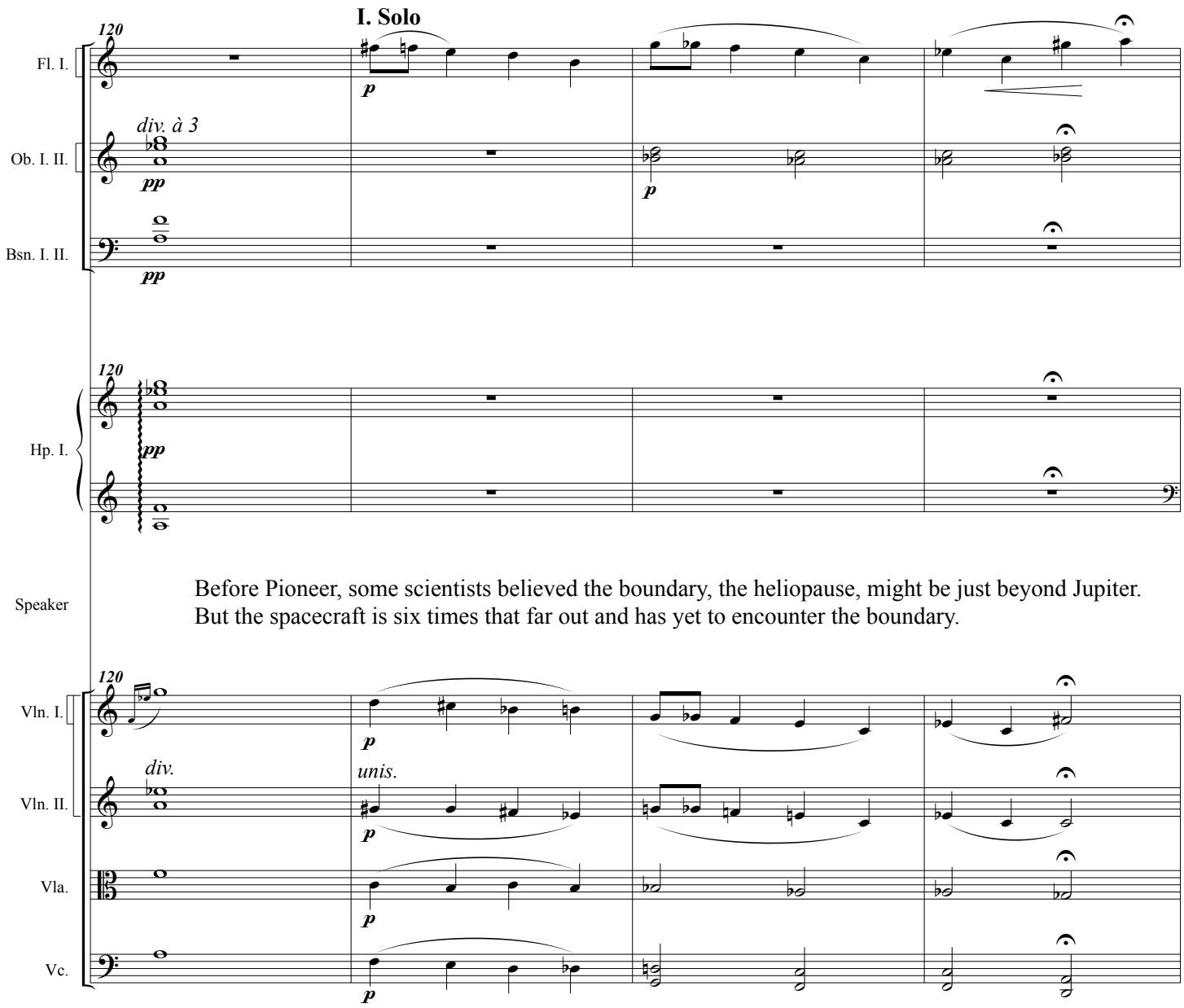
On June 13, Pioneer's outbound trajectory will cross Neptune's orbit, 2.81 billion miles from the Sun. Normally Pluto is the outermost planet, but because its orbit is lightly elliptical, unlike the roughly circular orbits of the other planets, Pluto is now nearer to the Sun than Neptune, and will be for the next 17 years.



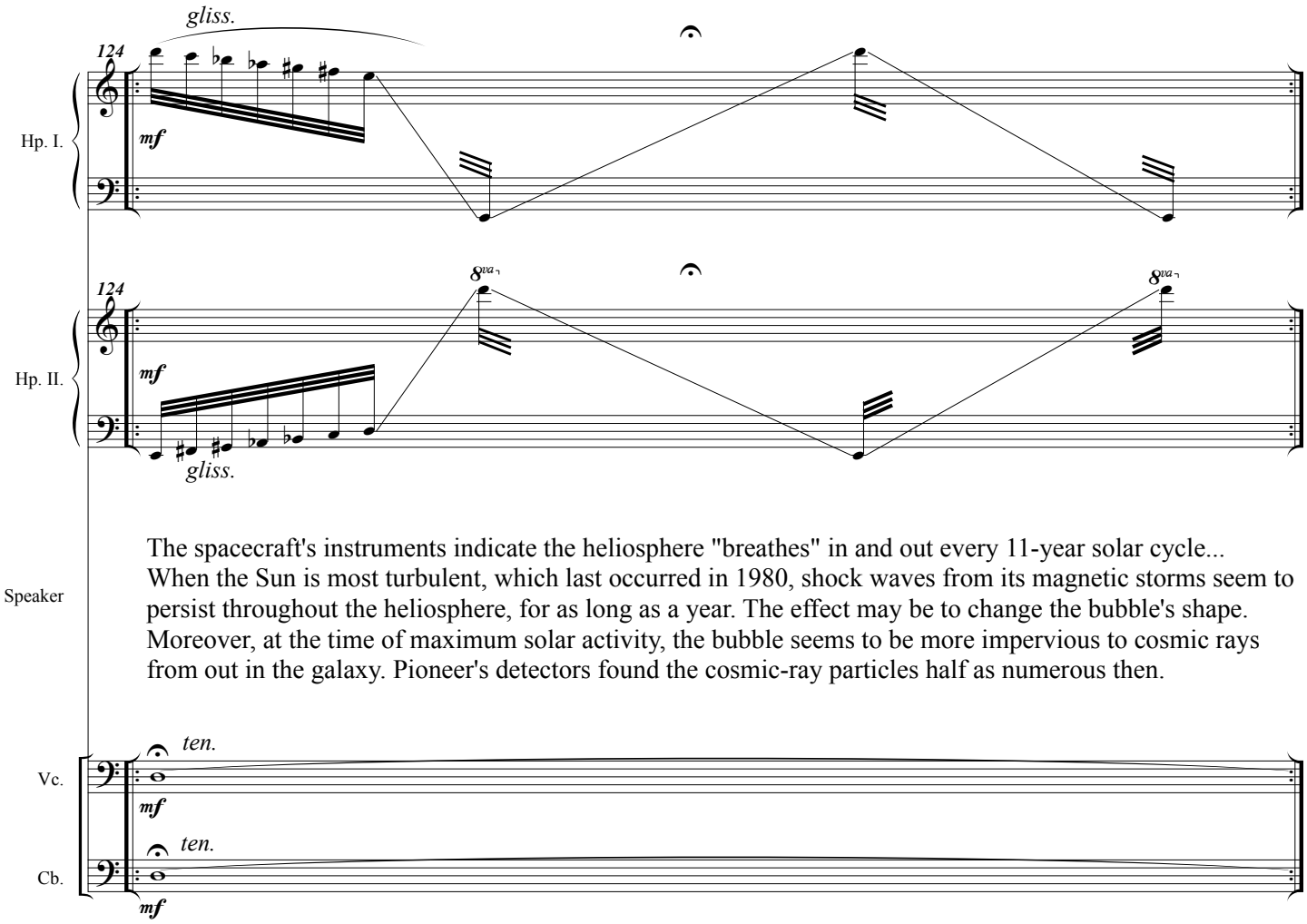

Moderato (poco lento)
I. Solo
espress.
Hn. I.
Speaker
Each day flight controllers at Ames typically send Pioneer a message when they arrive at work. By quitting time eight and a half hours later, which is the round-trip communications time, they receive Pioneer's reply.
unis.
espress.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
unis.
div.
unis.

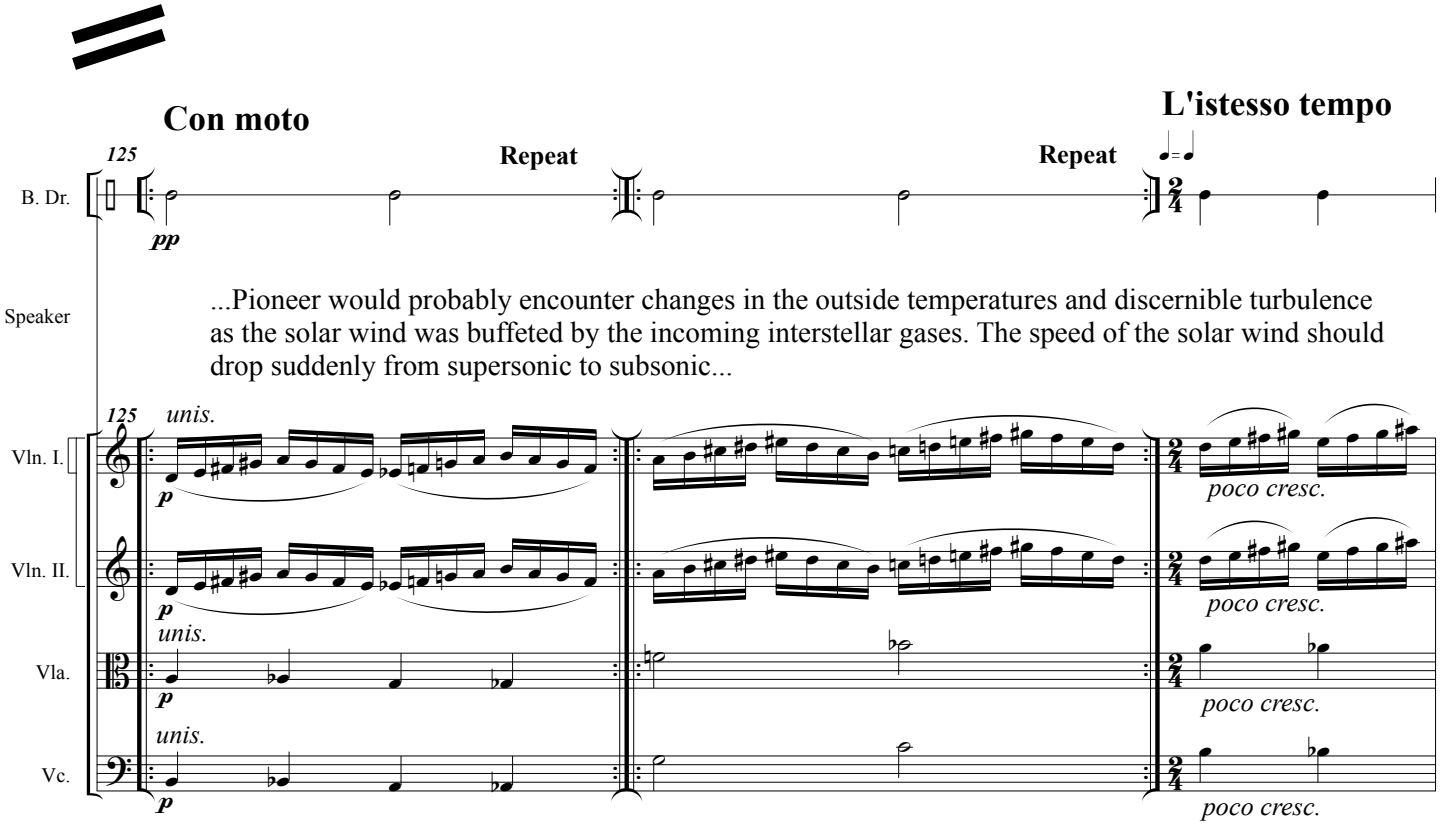

111
Hp. I.
l.v.
p
ppp
111
Hp. II.
l.v.
p
ppp
Speaker
They also receive about 16 hours of scientific data each day from the spacecraft, mainly information defining the extent and behavior of the heliosphere, the Sun's extended atmosphere. Blowing away in all directions from the Sun is the solar wind, an electrically charged gas composed of protons (hydrogen nuclei) and electrons that stream out from the Sun's corona. The wind carries along with it the Sun's magnetic field.
111
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
ten.
ppp

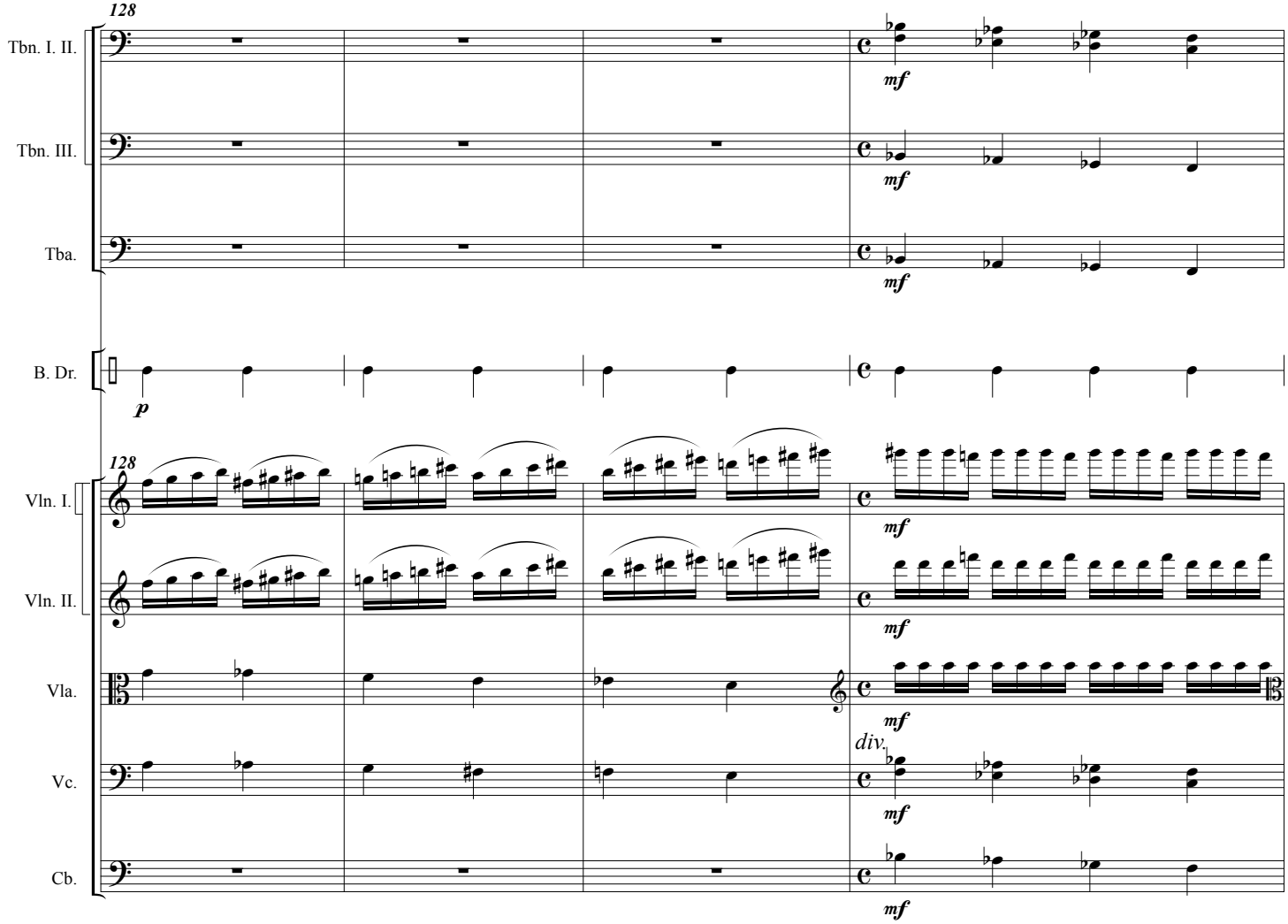

Lento
A tempo
115
Picc.
I.
Ob. I.
unis.
Cl. I. II.
Cl. III.
Trgl.
Hp. I.
Hp. II.
Speaker
It is as if the Sun is blowing a pressure bubble out into space, a tear-shaped magnetic bubble that acts as a barrier against intrusions by most particles from the interstellar medium. The bubble is streamlined by the motion of the solar system through this interstellar gas. At the solar system's leaking edge, so to speak, the bubble is blunted. In the opposite direction, the bubble forms a long tail. Pioneer 10 is traveling down the tail of the heliosphere.
Vln. I.
Vln. II.
Vla.
Vc.
div.
unis.

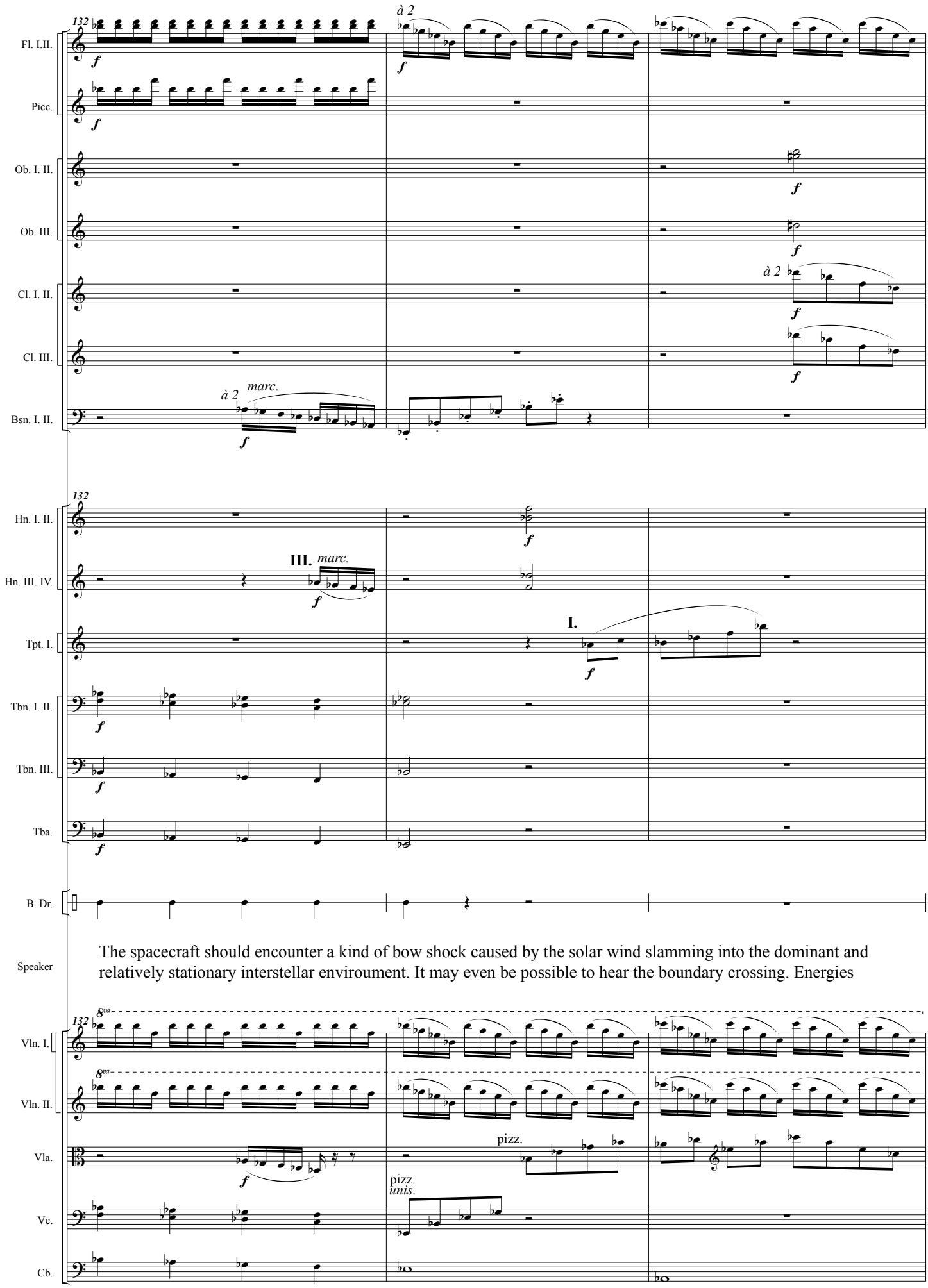

I. Solo
120
Fl. I.
p
div. à 3
Ob. I. II.
pp
p
Bsn. I. II.
pp
120
Hp. I.
pp
Speaker
Before Pioneer, some scientists believed the boundary, the heliopause, might be just beyond Jupiter.
But the spacecraft is six times that far out and has yet to encounter the boundary.
120
Vln. I.
p
div.
unis.
Vln. II.
p
Vla.
p
Vc.
p

Repeat ad lib. under dialogue

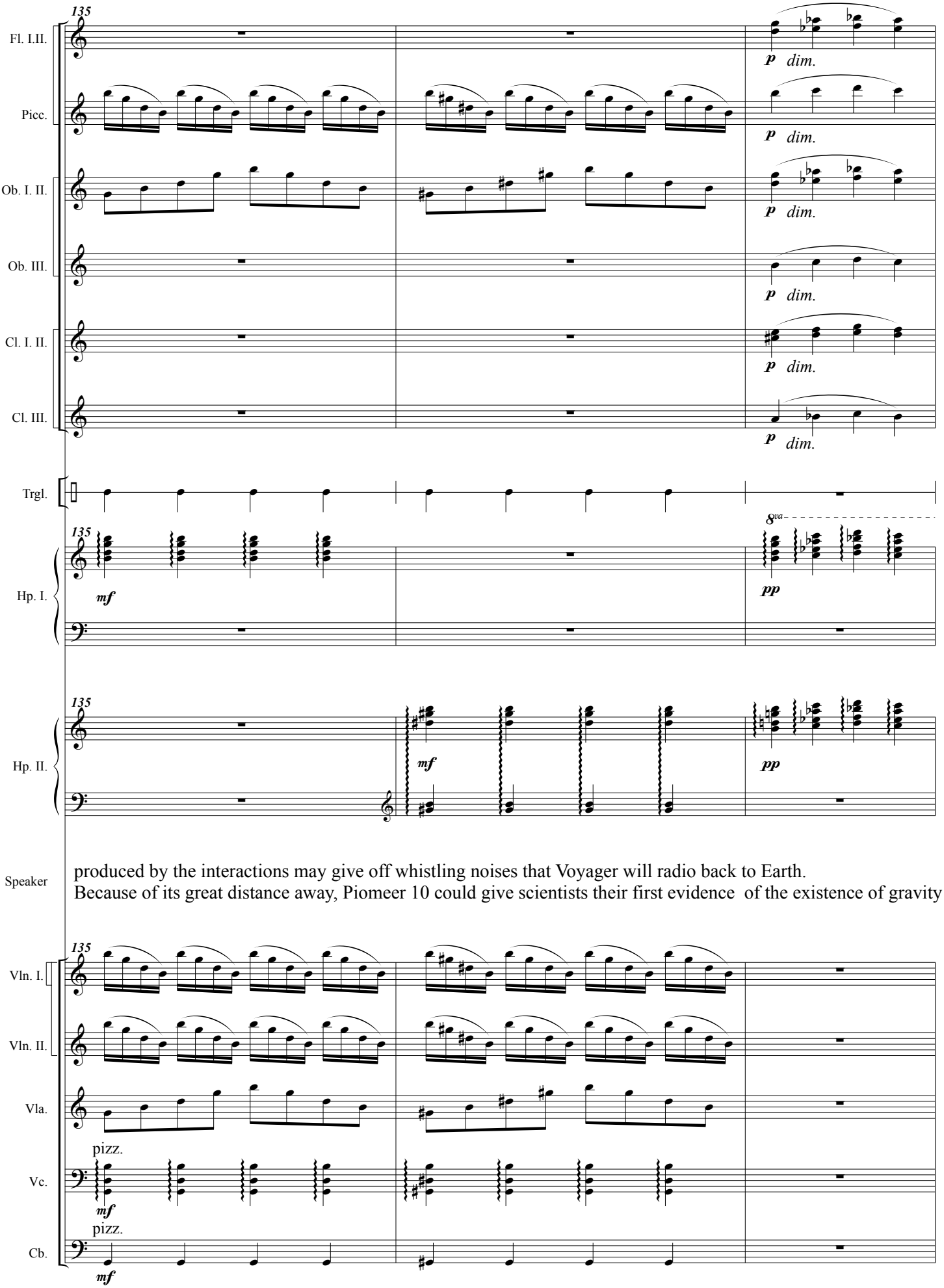


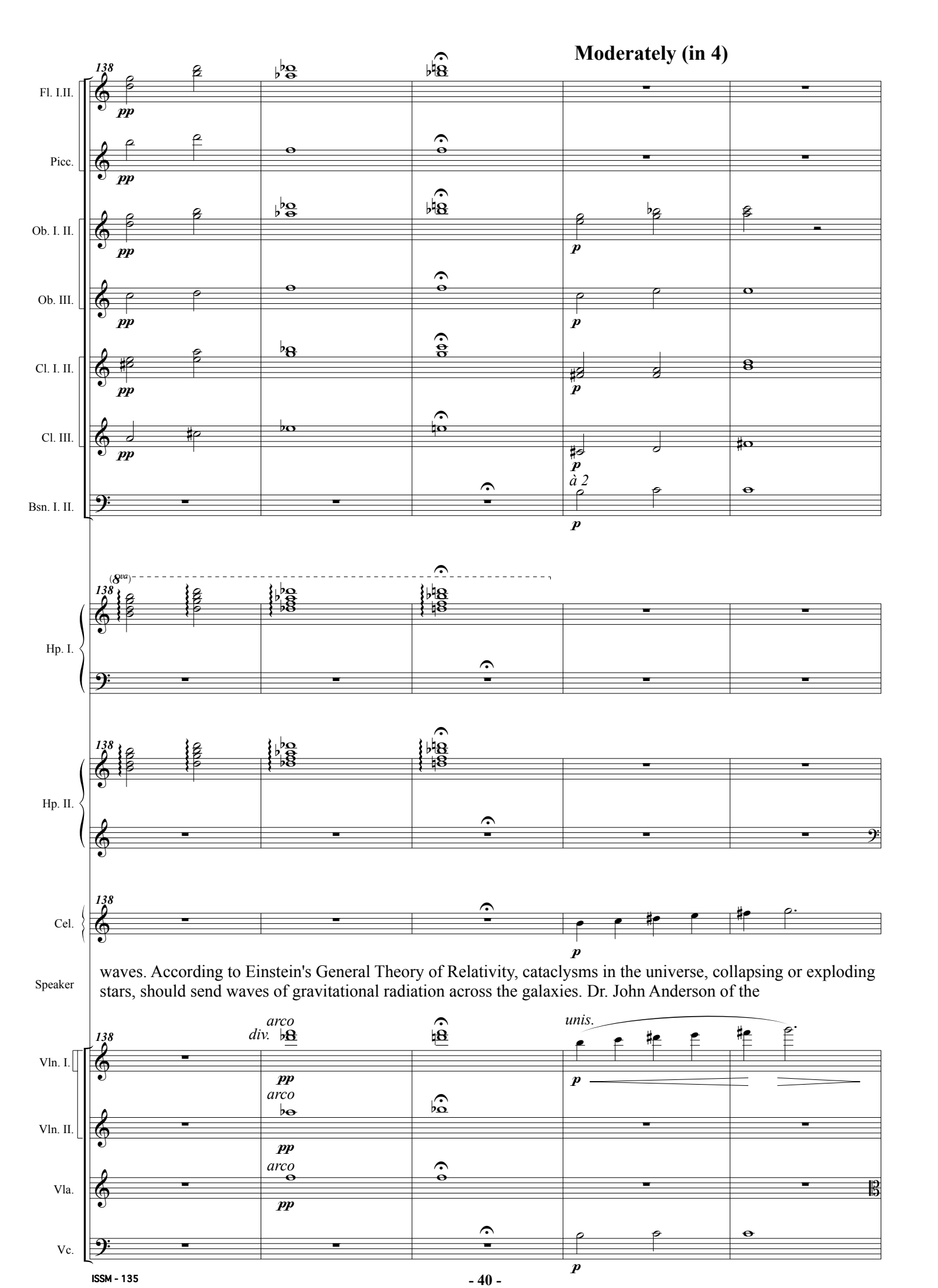


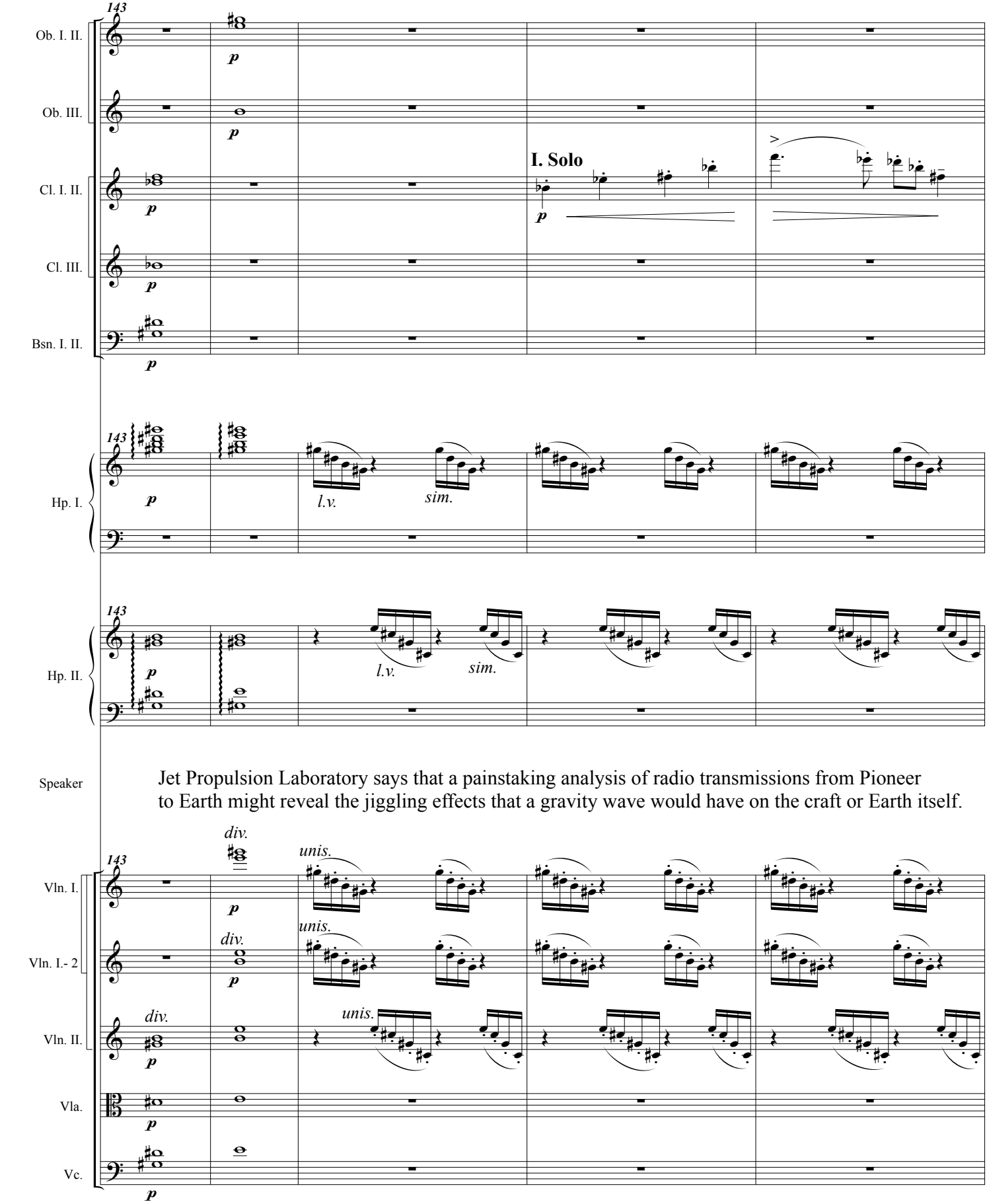

128
Tbn. I. II.
Tbn. III.
Tba.
B. Dr.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
mf
p
div.

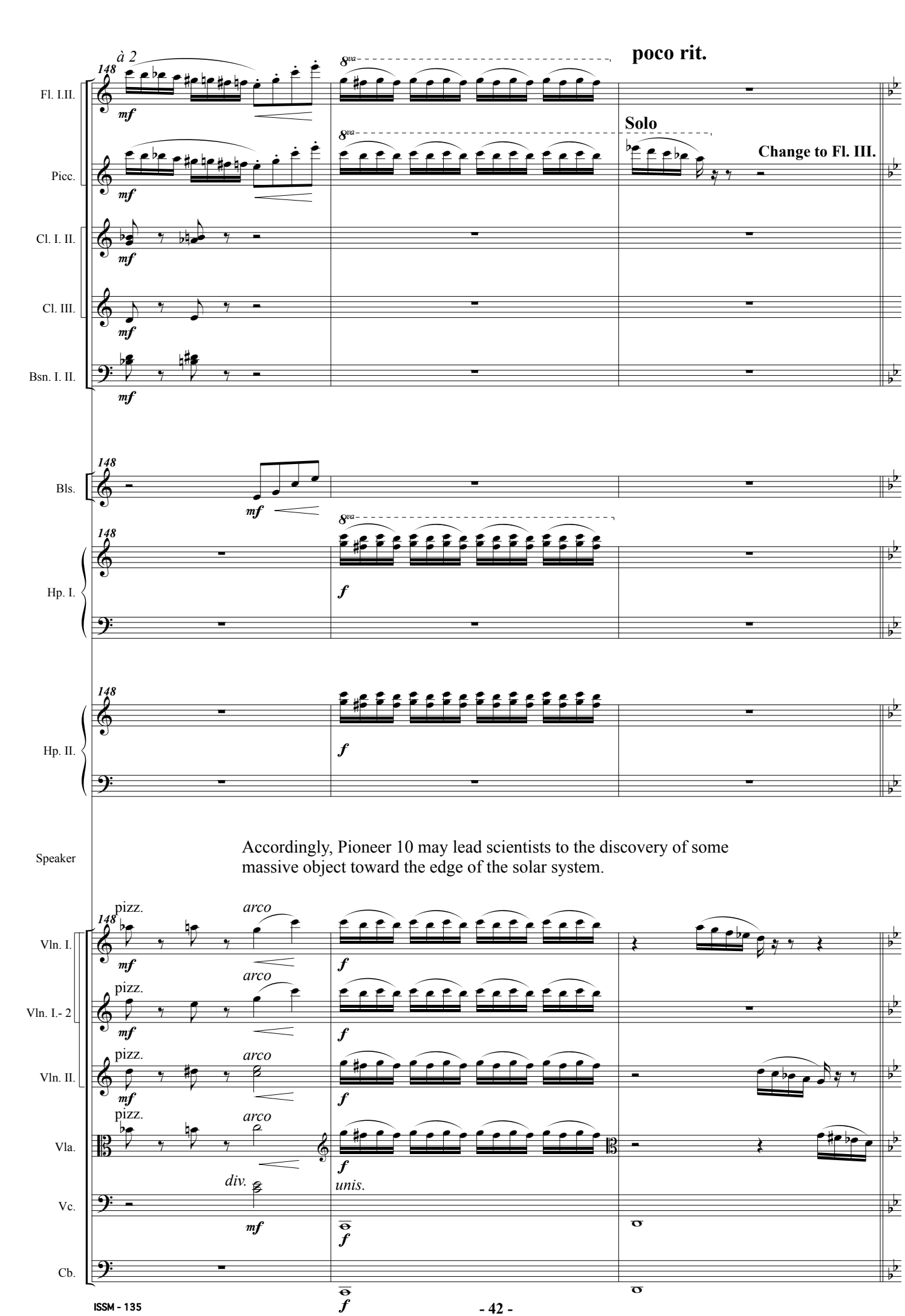

132
à 2
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
marc.
Hn. I. II.
Hn. III. IV.
III.
Tpt. I.
I.
Tbn. I. II.
Tbn. III.
Tba.
B. Dr.
Speaker
The spacecraft should encounter a kind of bow shock caused by the solar wind slamming into the dominant and relatively stationary interstellar enviroument. It may even be possible to hear the boundary crossing. Energies
8va
Vln. I.
Vln. II.
Vla.
pizz.
unis.
Vc.
Cb.

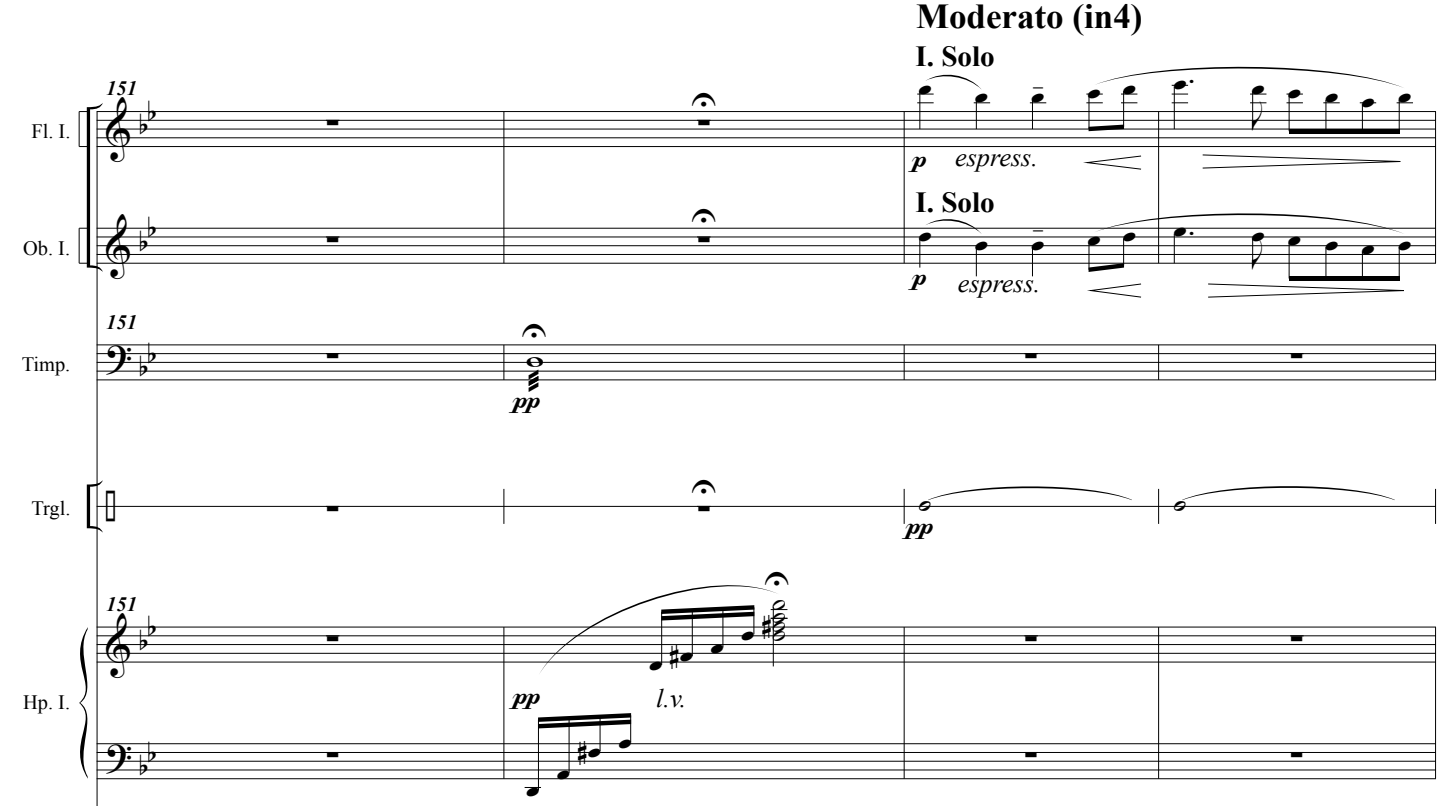
Poco meno mosso




Moderately (in 4)
138
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
pp
p
à 2
(8va)
Hp. I.
Hp. II.
Cel.
Speaker
waves. According to Einstein's General Theory of Relativity, cataclysms in the universe, collapsing or exploding stars, should send waves of gravitational radiation across the galaxies. Dr. John Anderson of the
arco
div.
arco
unis.
Vln. I.
Vln. II.
Vla.
Vc.

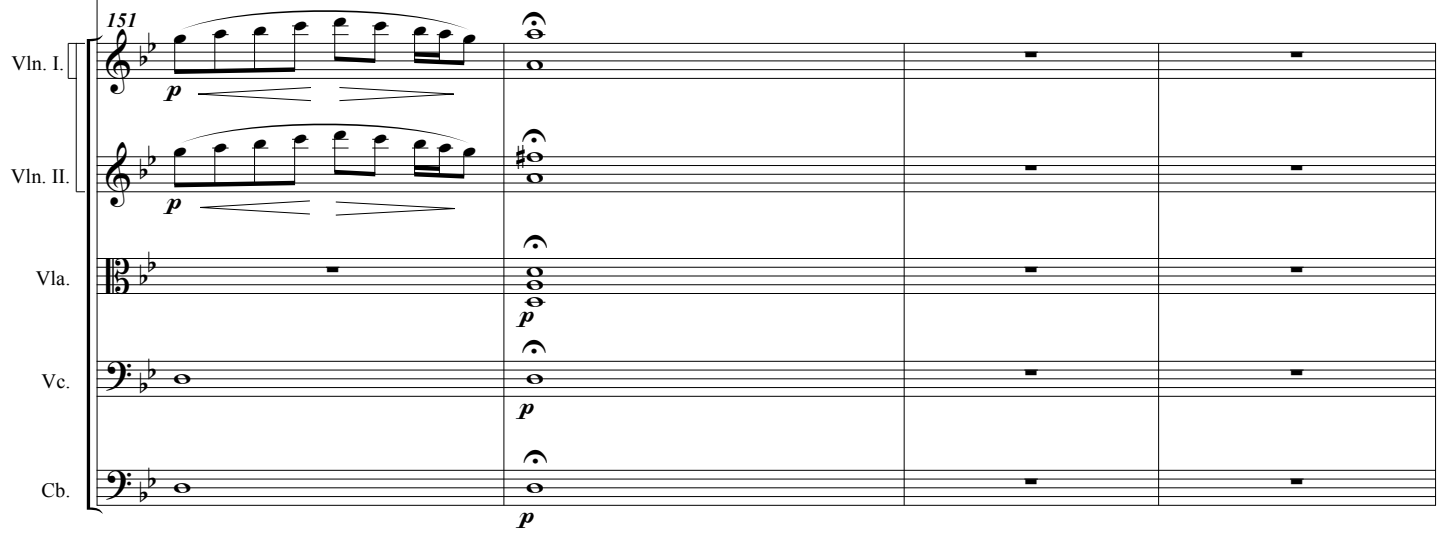

143
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
I. Solo
Hp. I.
l.v.
sim.
Hp. II.
Speaker
Jet Propulsion Laboratory says that a painstaking analysis of radio transmissions from Pioneer to Earth might reveal the jiggling effects that a gravity wave would have on the craft or Earth itself.
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
div.
unis.

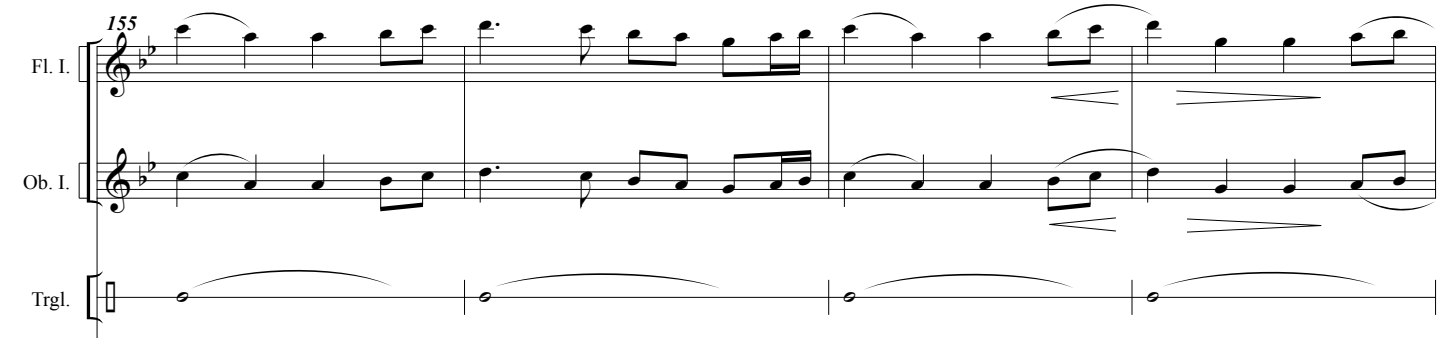

à 2
148
poco rit.
Fl. I.II.
Picc.
Solo
Change to Fl. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Bls.
Hp. I.
Hp. II.
Speaker
Accordingly, Pioneer 10 may lead scientists to the discovery of some massive object toward the edge of the solar system.
Vln. I.
Vln. I.- 2
Vln. II.
Vla.
Vc.
Cb.
pizz.
arco
div.
unis.



Speaker

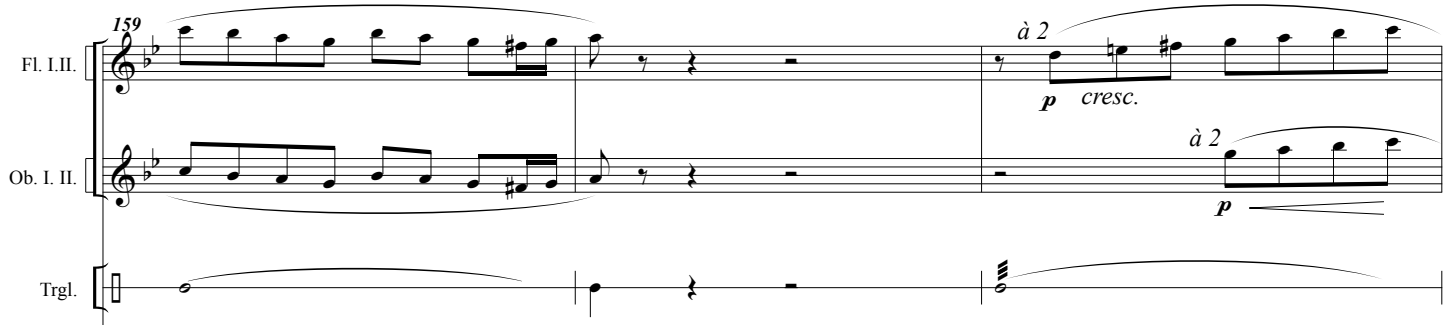
It may be, as some astronomers suspect, a "brown dwarf" star, a celestial object that was not quite massive enough for its thermonuclear furnace to ignite. Since most stars are paired, it is not unreasonable





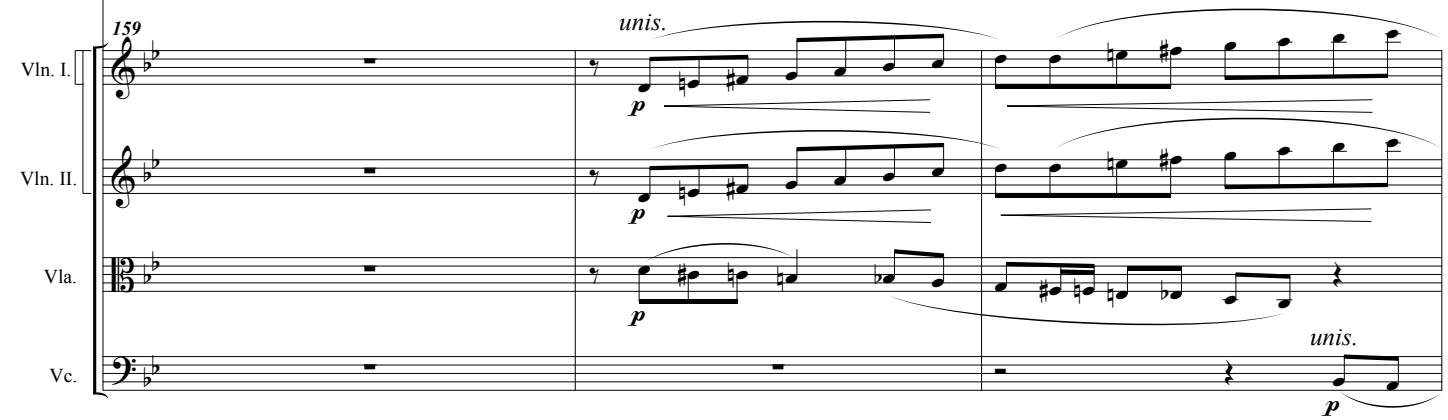
Speaker

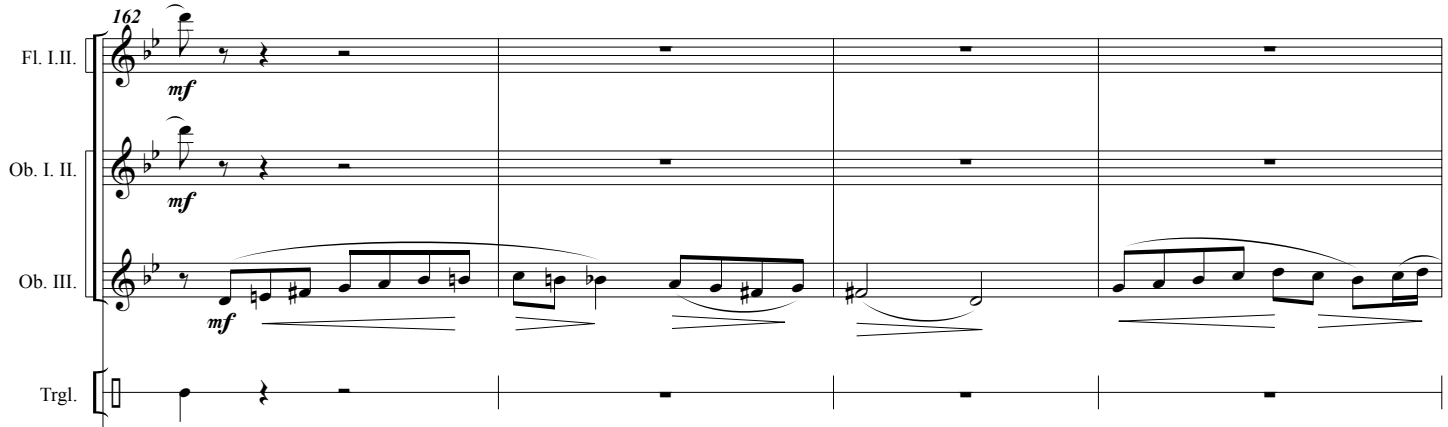
to assume that the Sun might have such a dim companion. Or the force could be from a 10th planet, the long-sought Planet X. Evidence assembled in recent years has led several groups of astronomers



Speaker

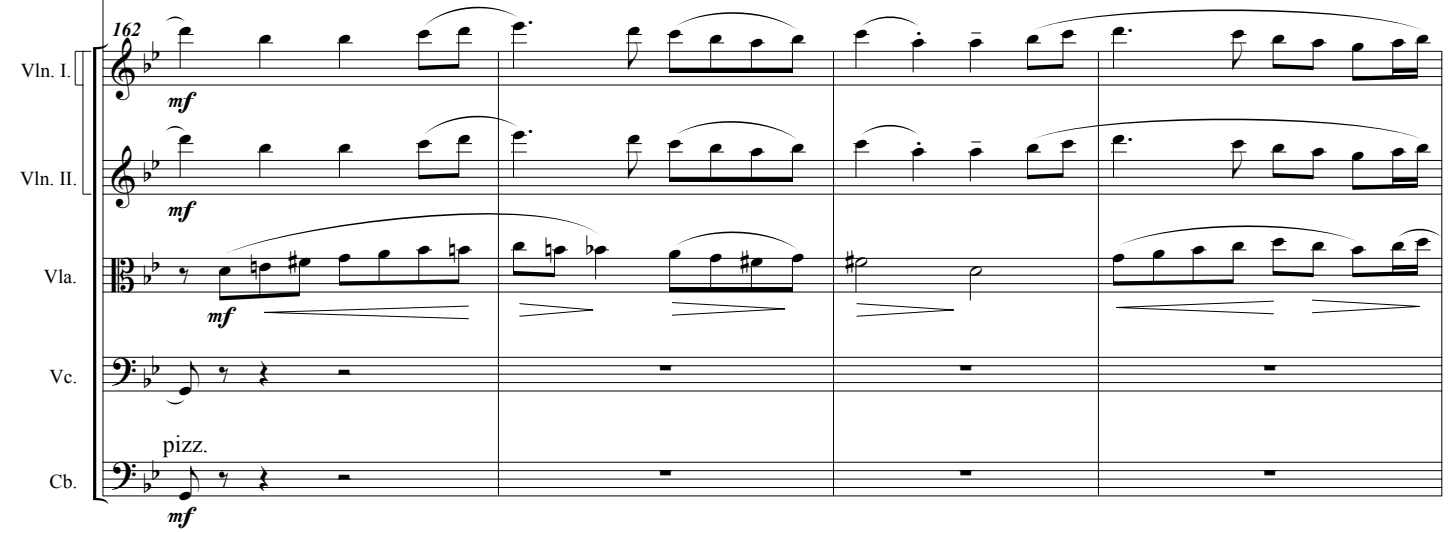
to renew the search for a large planet out beyond Pluto and Neptune.
Someday, of course, even the durable Pioneer 10 will lose

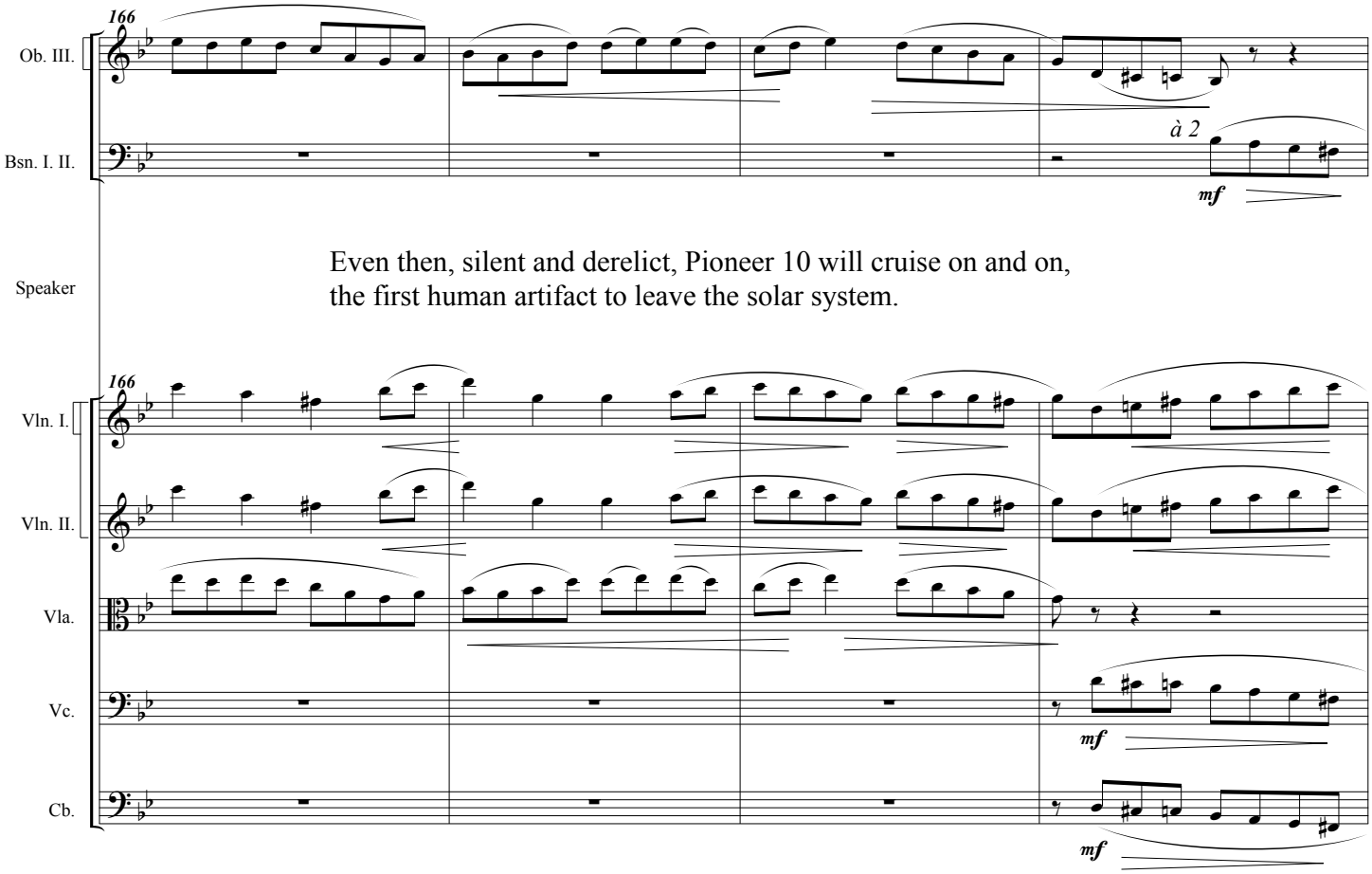


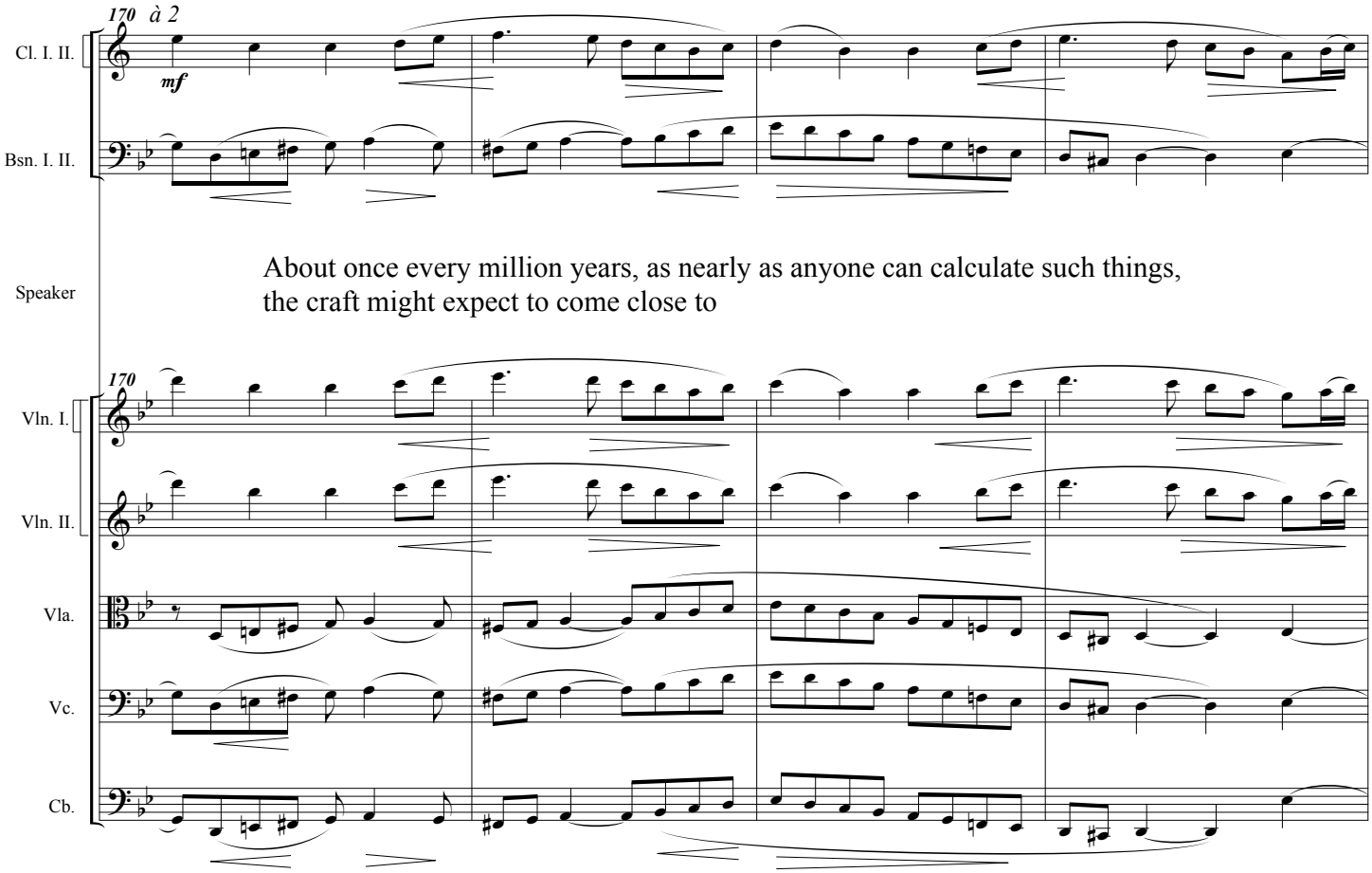


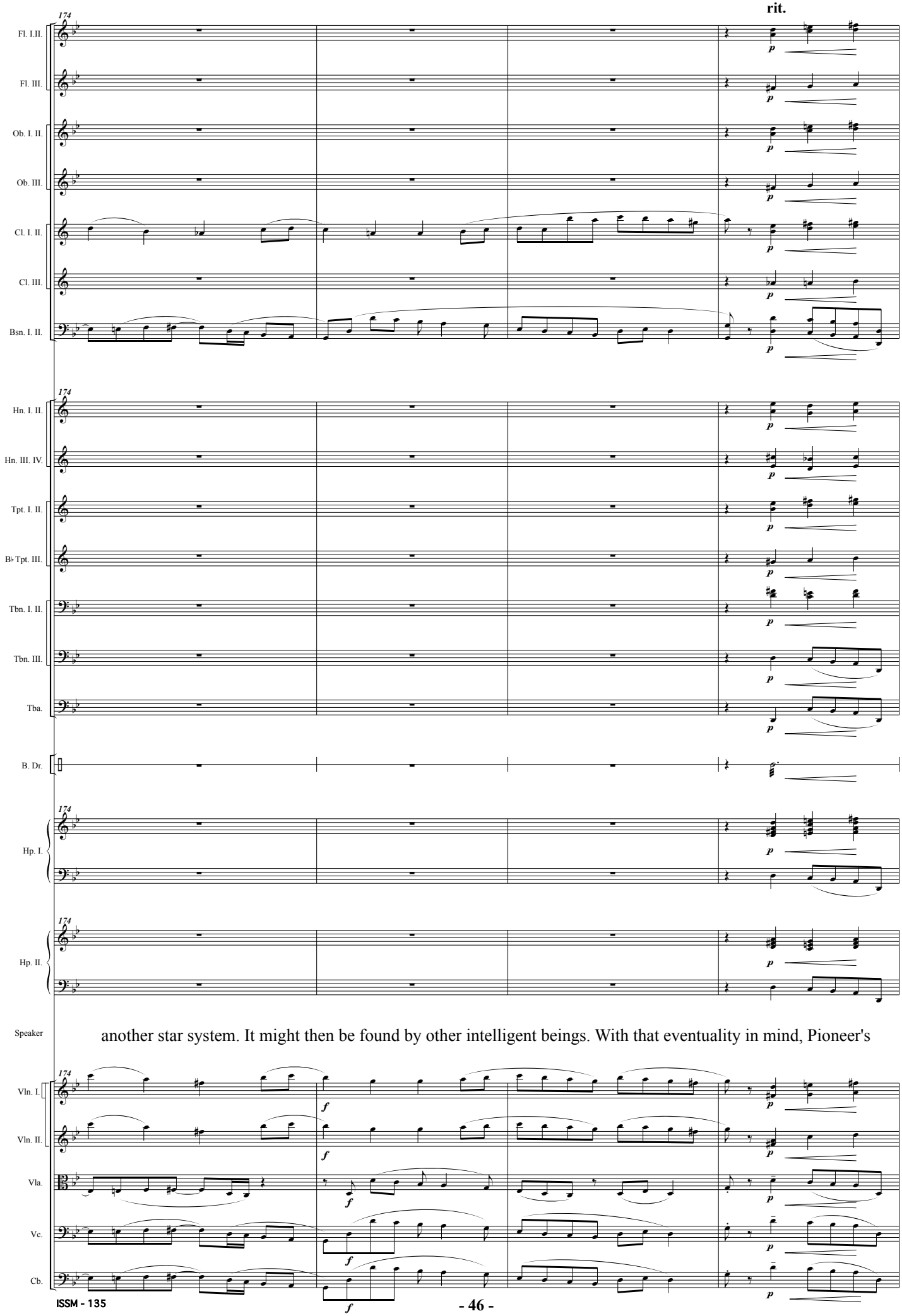
Speaker

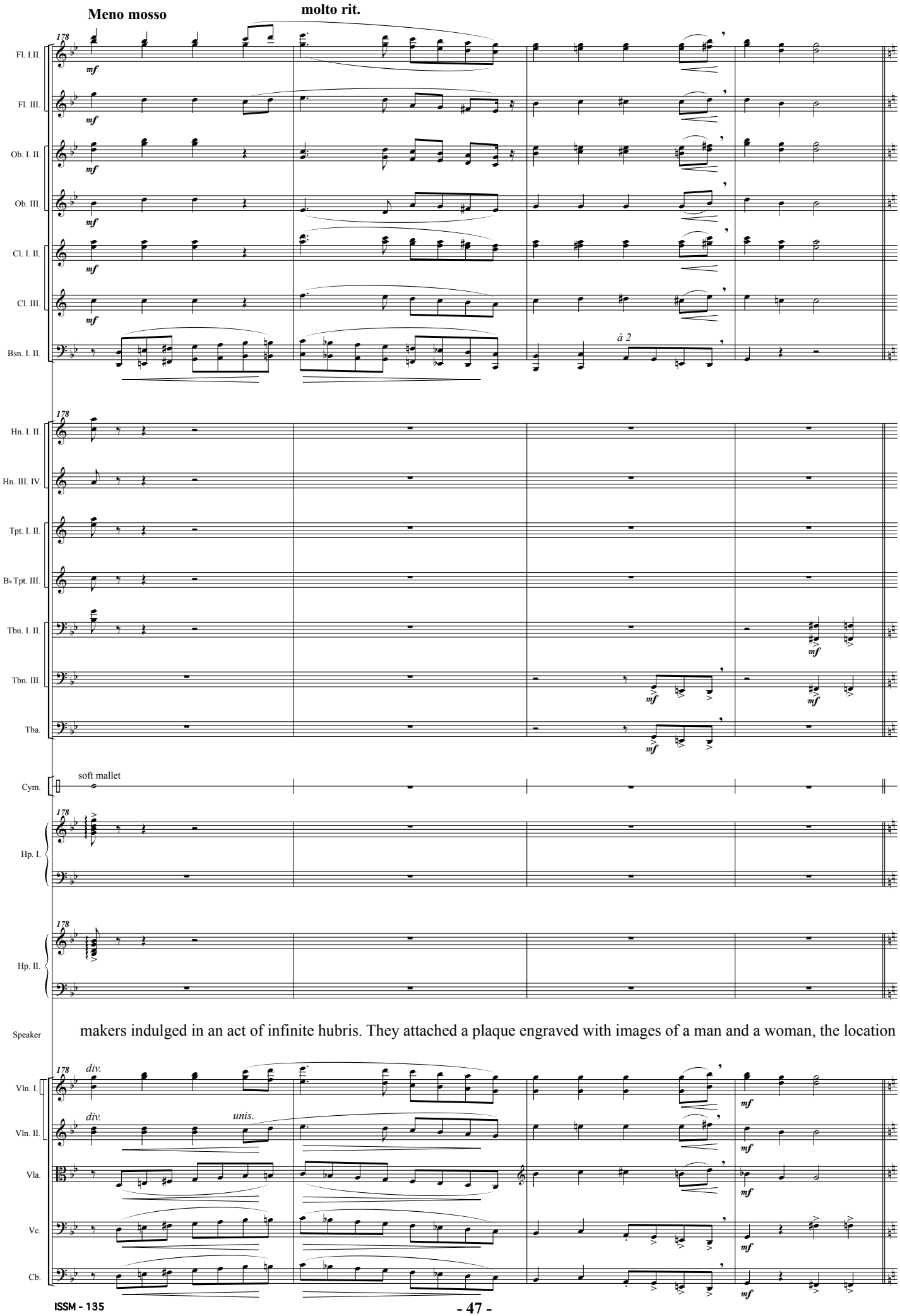
touch with those who sent it off on its long journey. The little radio that has already transmitted more than 126 billion bits of scientific data will go dead. Sensors will lose sight of the Sun.

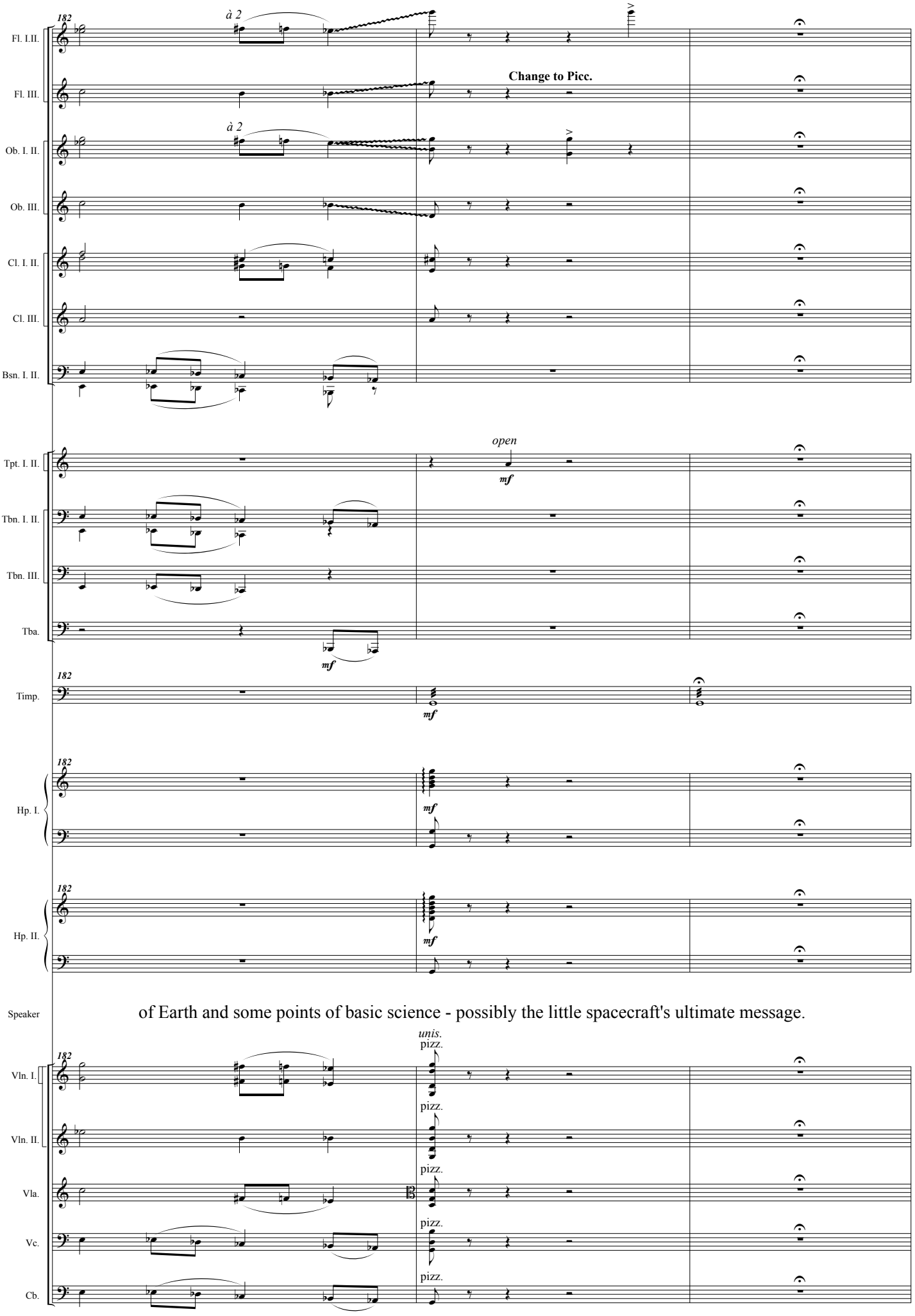


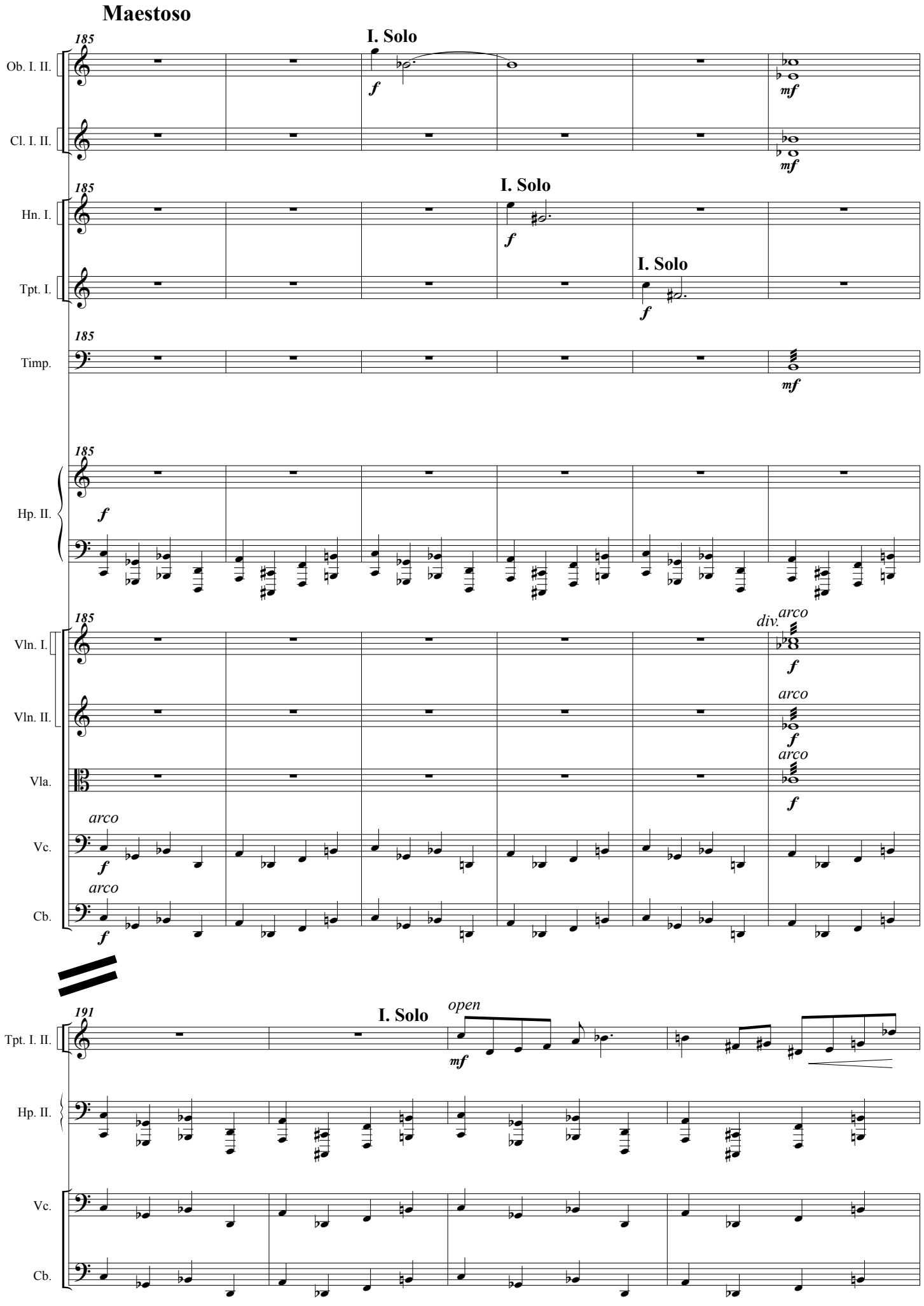

166
Ob. III.
Bsn. I. II.
à 2
mf
Even then, silent and derelict, Pioneer 10 will cruise on and on,
the first human artifact to leave the solar system.
166
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
mf
mf

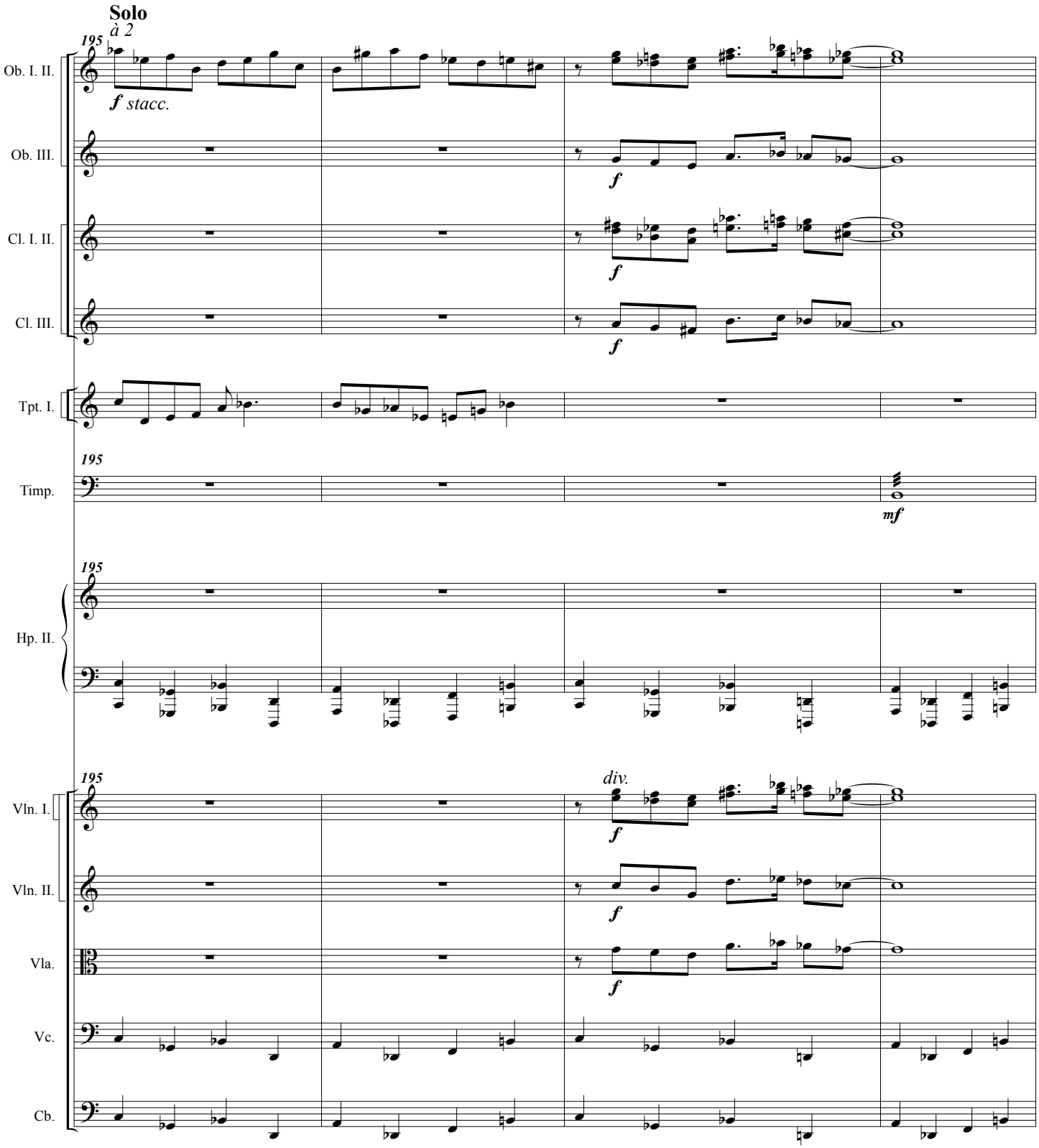

170 à 2
Cl. I. II.
Bsn. I. II.
mf
About once every million years, as nearly as anyone can calculate such things,
the craft might expect to come close to
170
Vln. I.
Vln. II.
Vla.
Vc.
Cb.

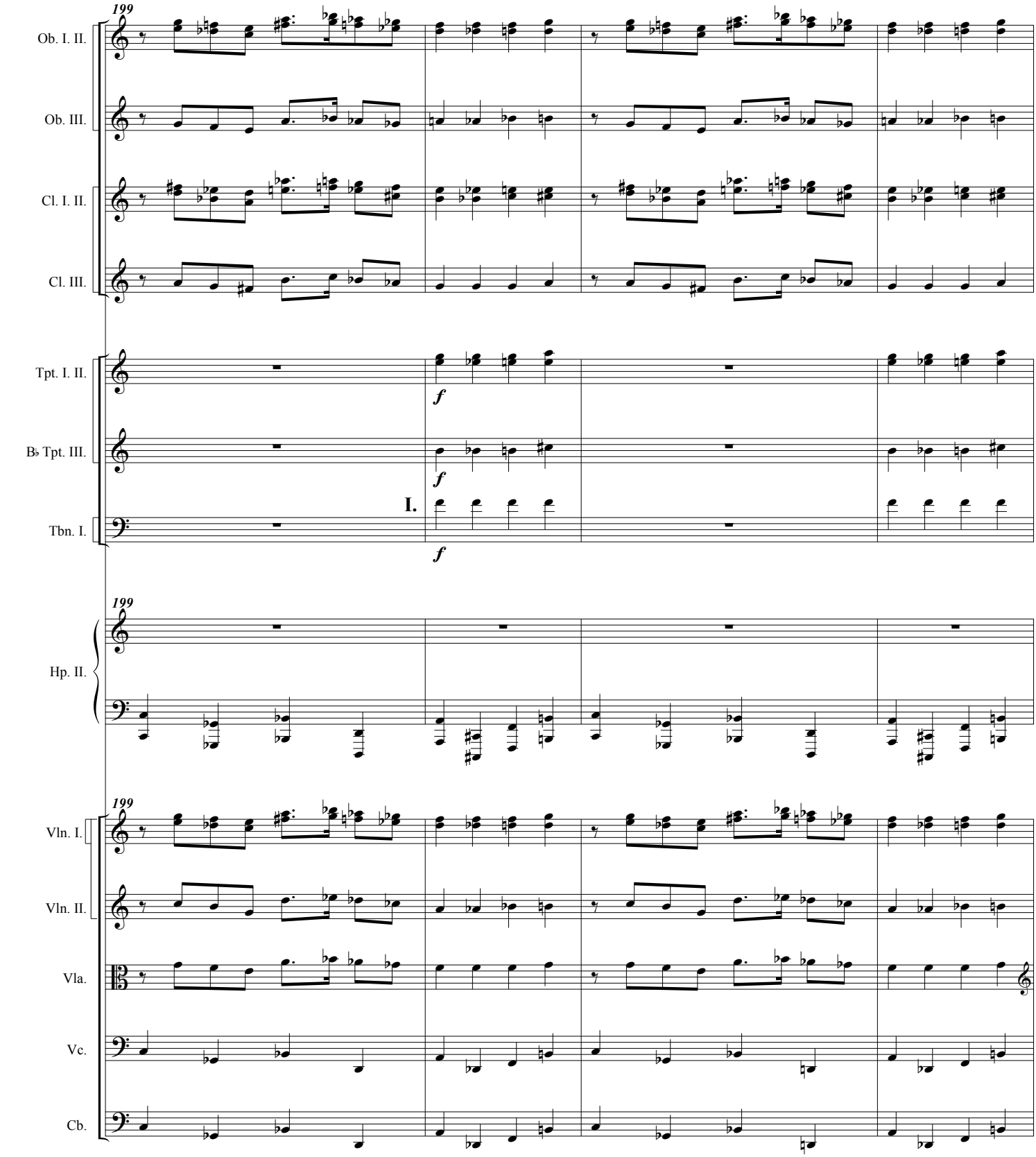

rit.
174
Fl. I.II.
Fl. III.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I. II.
Tbn. III.
Tba.
B. Dr.
Hp. I.
Hp. II.
Speaker
another star system. It might then be found by other intelligent beings. With that eventuality in mind, Pioneer's
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
p
f

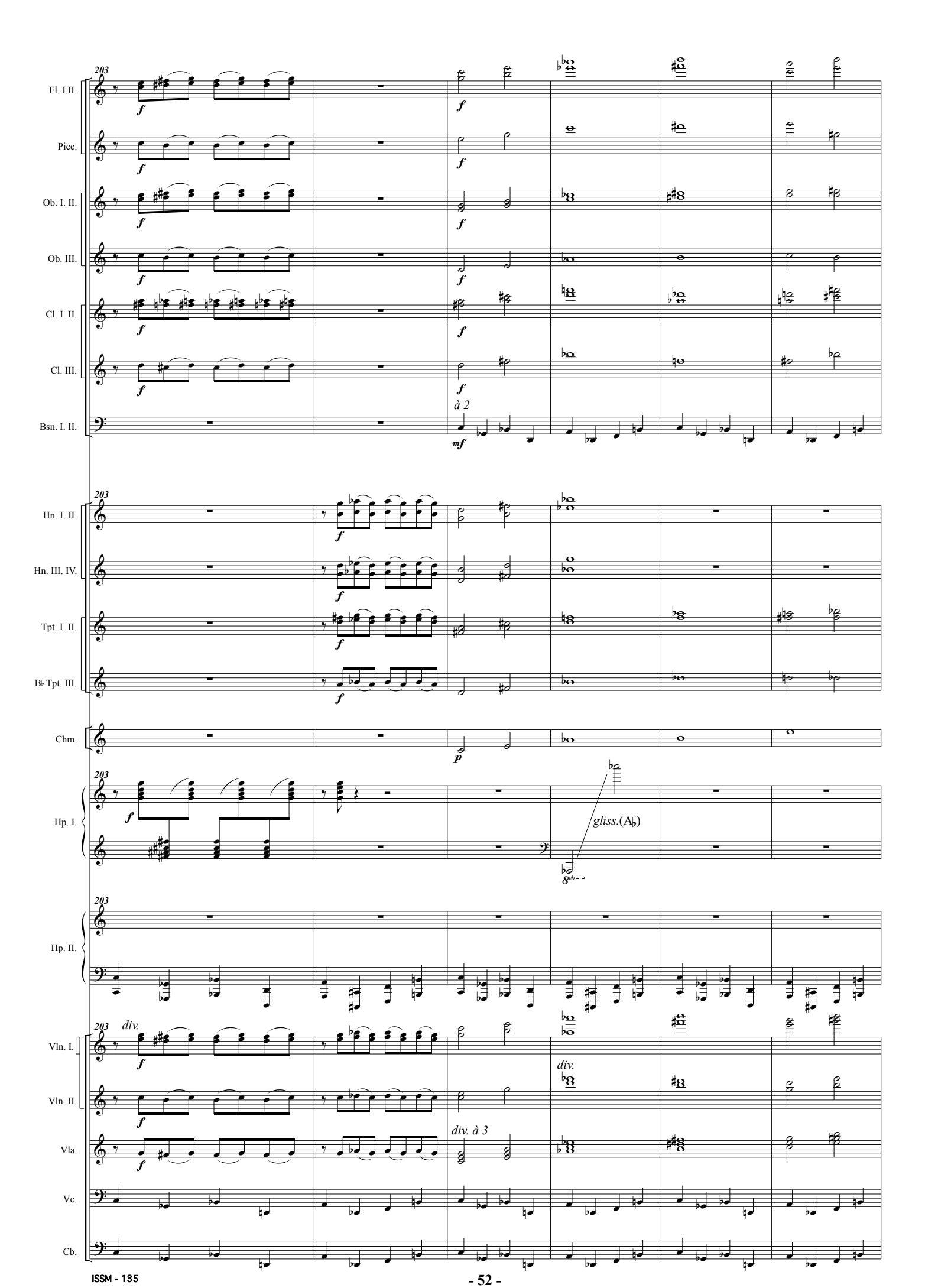

Meno mosso
molto rit.
178
Fl. I.II.
Fl. III.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
à 2
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I. II.
Tbn. III.
Tba.
soft mallet
Cym.
Hp. I.
Hp. II.
Speaker
makers indulged in an act of infinite hubris. They attached a plaque engraved with images of a man and a woman, the location
div.
unis.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
mf

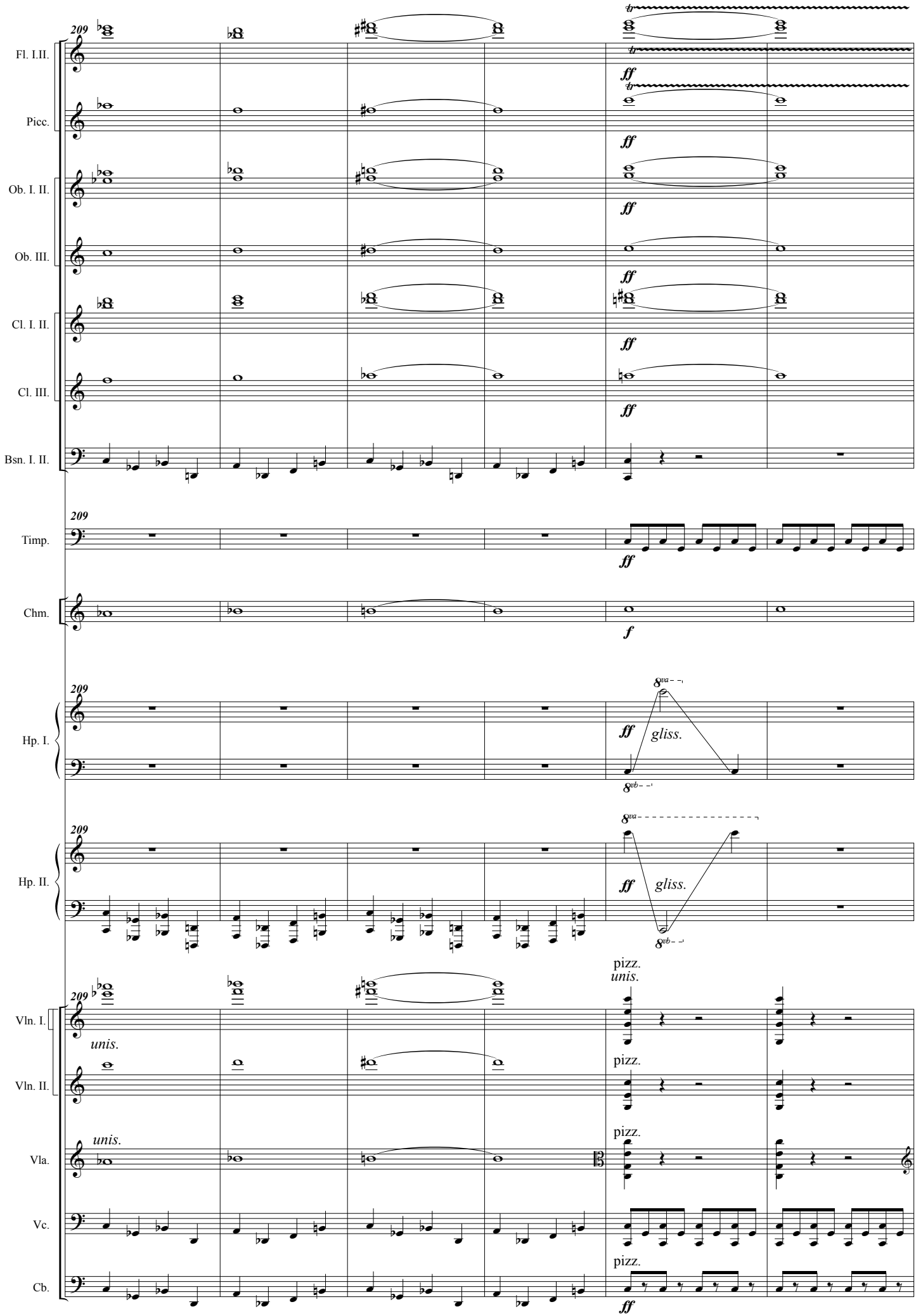

182
à 2
Change to Picc.
Fl. I.II.
Fl. III.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
open
mf
Tpt. I. II.
Tbn. I. II.
Tbn. III.
Tba.
Timp.
Hp. I.
Hp. II.
Speaker
of Earth and some points of basic science - possibly the little spacecraft's ultimate message.
unis.
pizz.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.


Maestoso
185
I. Solo
Ob. I. II.
Cl. I. II.
Hn. I.
Tpt. I.
Timp.
Hp. II.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
f
mf
div.
arco
191
open
Tpt. I. II.

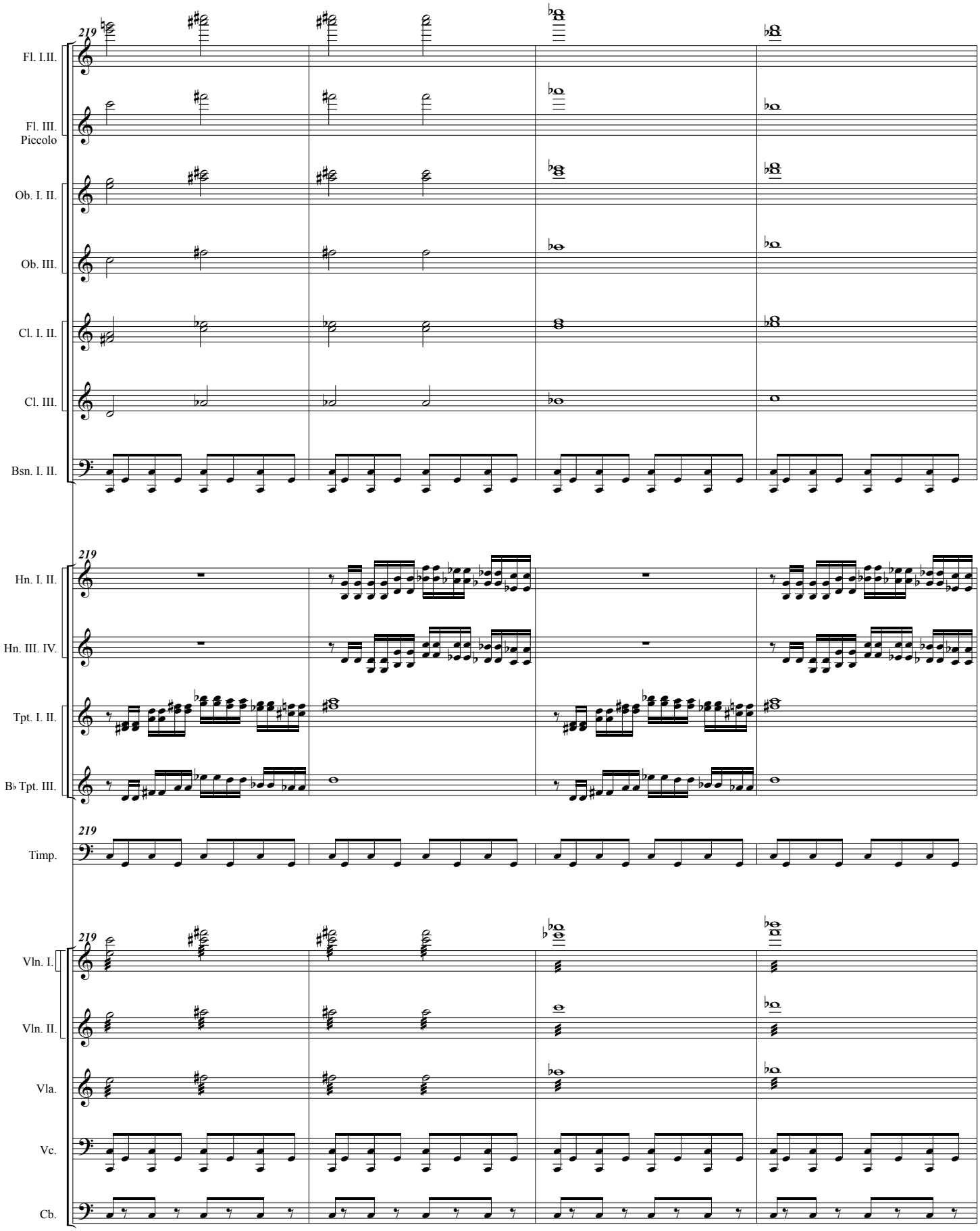

Solo
à 2
195
Ob. I. II.
f stacc.
Ob. III.
f
Cl. I. II.
f
Cl. III.
f
Tpt. I.
195
Timp.
mf
195
Hp. II.
195
div.
Vln. I.
f
Vln. II.
f
Vla.
f
Vc.
Cb.

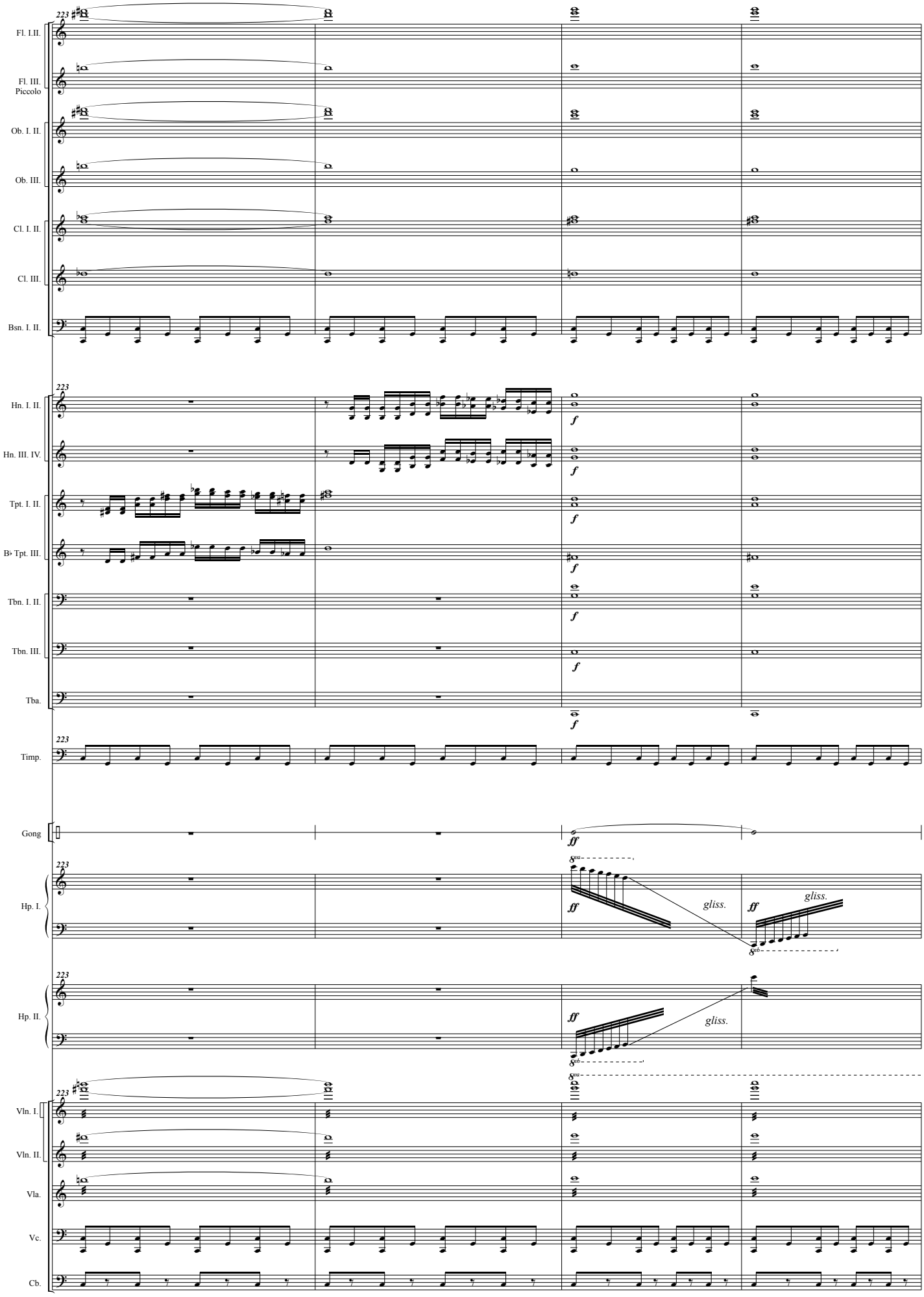

199
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I.
f
f
I.
f
199
Hp. II.
199
Vln. I.
Vln. II.
Vla.
Vc.
Cb.

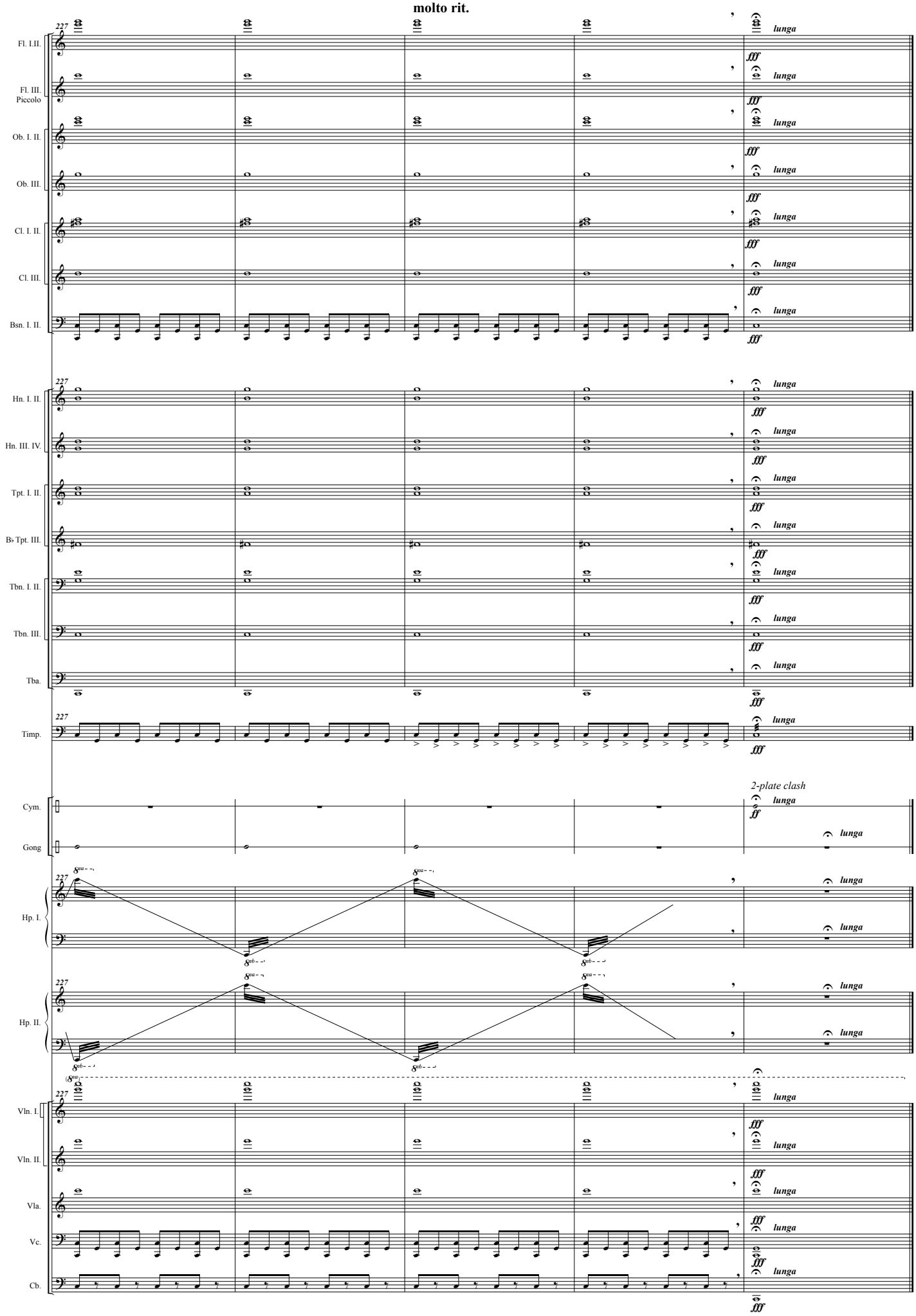

203
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
à 2
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Chm.
Hp. I.
gliss.(A♭)
Hp. II.
div.
Vln. I.
Vln. II.
div. à 3
Vla.
Vc.
Cb.


209
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Timp.
Chm.
Hp. I.
Hp. II.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
tr
ff
f
gliss.
8va
8vb
unis.
pizz.

215
Fl. I.II.
Picc.
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
215
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
f
215
Timp.
Gong
div.
arco
215
Vln. I.
arco
Vln. II.
arco
Vla.
Vc.
Cb.


219
Fl. I.II.
Fl. III.
Piccolo
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
219
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
219
Timp.
219
Vln. I.
Vln. II.
Vla.
Vc.
Cb.


molto rinforz. e rall.
223
Fl. I.II.
Fl. III. Piccolo
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I. II.
Tbn. III.
Tba.
Timp.
Gong
Hp. I.
Hp. II.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
f
ff
gliss.


molto rit.
227
Fl. I.II.
Fl. III. Piccolo
Ob. I. II.
Ob. III.
Cl. I. II.
Cl. III.
Bsn. I. II.
Hn. I. II.
Hn. III. IV.
Tpt. I. II.
B♭ Tpt. III.
Tbn. I. II.
Tbn. III.
Tba.
Timp.
Cym.
Gong
Hp. I.
Hp. II.
Vln. I.
Vln. II.
Vla.
Vc.
Cb.
lunga
fff
ff
2-plate clash