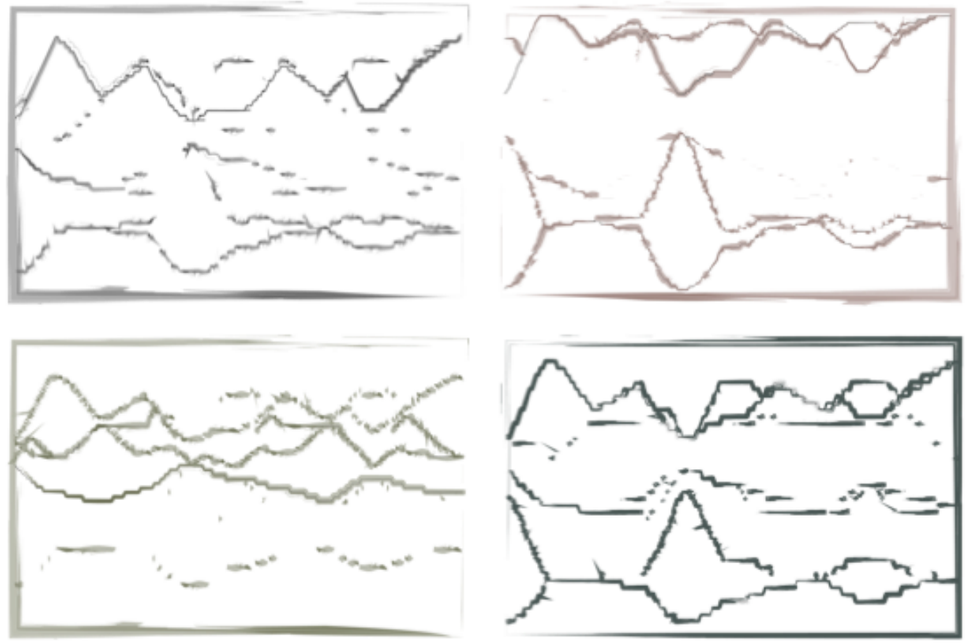
Ricercare

(Invention for data streams n.2)



for flute and electronic basso continuo

by

Marco Buongiorno Nardelli

materialssoundmusic

Ricercare (the second piece in the collection *Inventions for data streams*) is constructed using the principles of materialssoundmusic, a new computer-aided data-driven composition (CADDC) environment based on the sonification and remix of scientific data streams (www.materialssoundmusic.com). The CADDC environment utilizes the materials property data from the online computational materials science repository AFLOWLIB.org. AFLOWLIB is an extensive (more than 630,000 entries and growing) repository of materials property data (phase-diagrams, electronic structure and magnetic properties to name a few) generated using high-throughput computational frameworks and freely available on the website of the AFLOW research consortium. These data are transformed into sound material (frequencies, MIDI numbers, pitch class sets, note durations, rhythmic patterns, amplitudes/gain, audio effects, etc.) in an automated fashion and then fed to audio generating patches for further musical remix.

The structure of *Ricercare* is a reinterpretation of the original "ricercare" style of the late renaissance and early baroque period. Here the word “ricercare“ (Italian for "to research") takes a double meaning: on one hand is the research the performer does to find the optimal connection between the flute and the sonification of the data stream in the *basso continuo* accompaniment; on the other, it refers to the scientific research work that has led to the data on which this composition is based. All the parts are directly based on the remix and sonification of the materials property data for Silicon, Germanium and Tin (Si1_ICSD_60389, Ge1_ICSD_181071 and Sn1_ICSD_53789 in AFLOWLIB.org), some of the group IVa elements of the periodic table. The flute part is built on the materials data mapped to pitch class sets (one of the output of the data manipulation algorithm). These pitch class sets are used in the original form found by the mapping procedure - no operation (translation, inversion or multiplication) is done on the sets. The rhythmic patterns oscillate between quasi-random sequences and continuous virtuosity runs as in a baroque solo section. The basso continuo is split in one harmonic and one percussive part. The harmonic part comes from the direct mapping of the materials data into MIDI note-on/note-off events streamed live through the DataPlayer app, a patch written for MAX for Live (see www.materialssoundmusic.com for more details on the mapping and sonification procedure). The percussive section doubles the flute part in a rhythmic unison triggered by the flute through an audio-to-MIDI pitch recognition Max for Live patch.

Performance notes:

The Ricercare.zip archive, which must be distributed with the score, contains the Live project, the Max for Live patches and all the necessary data files for the performance. File paths should be changed in the Max for Live presets.
The choice of the sounds for the electronic *basso continuo* part I (DataPlayer) can be left to the performer. My preferred choice would be to assign the DataPlayer part to an external synthesizer or a MIDI controlled player piano.

Ricercare

Inventions for data streams - n.2

Marco Buongiorno Nardelli

exact ♩= 90

Flute

pppp ffff pp f p mf f ff pp

A

Data Player
6 voices

Electronica

Flute DSP

Fl.

f mf sffz mf p

Ele.

ff mf pp mf f ff fff

Ele.

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13

Fl.

mf *mp* *mf* *f* *ff* *fff*

13

Ele.

13

17

Fl.

mf *fz* *mf*

B

17

Ele.

17

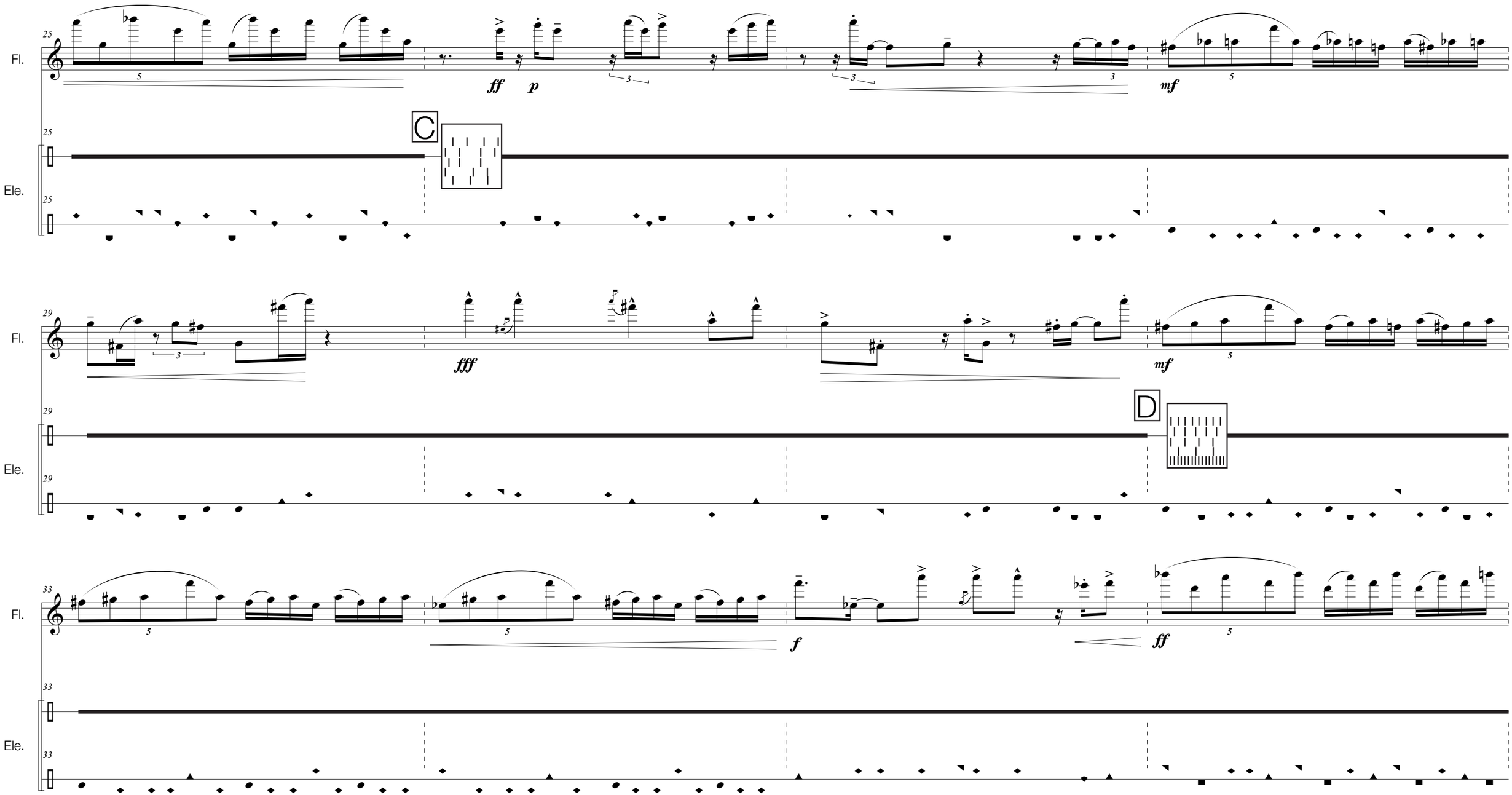
21

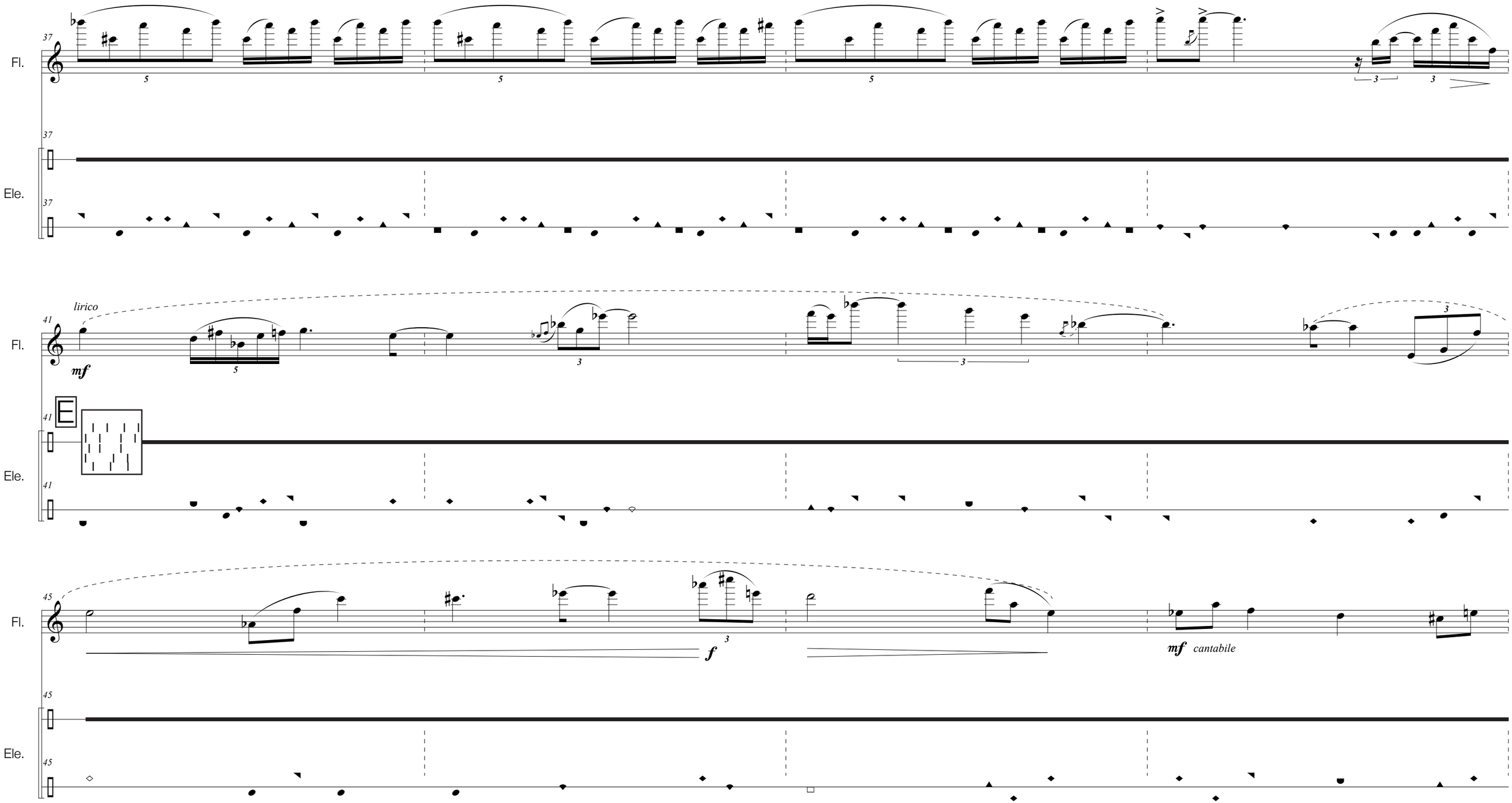
Fl.

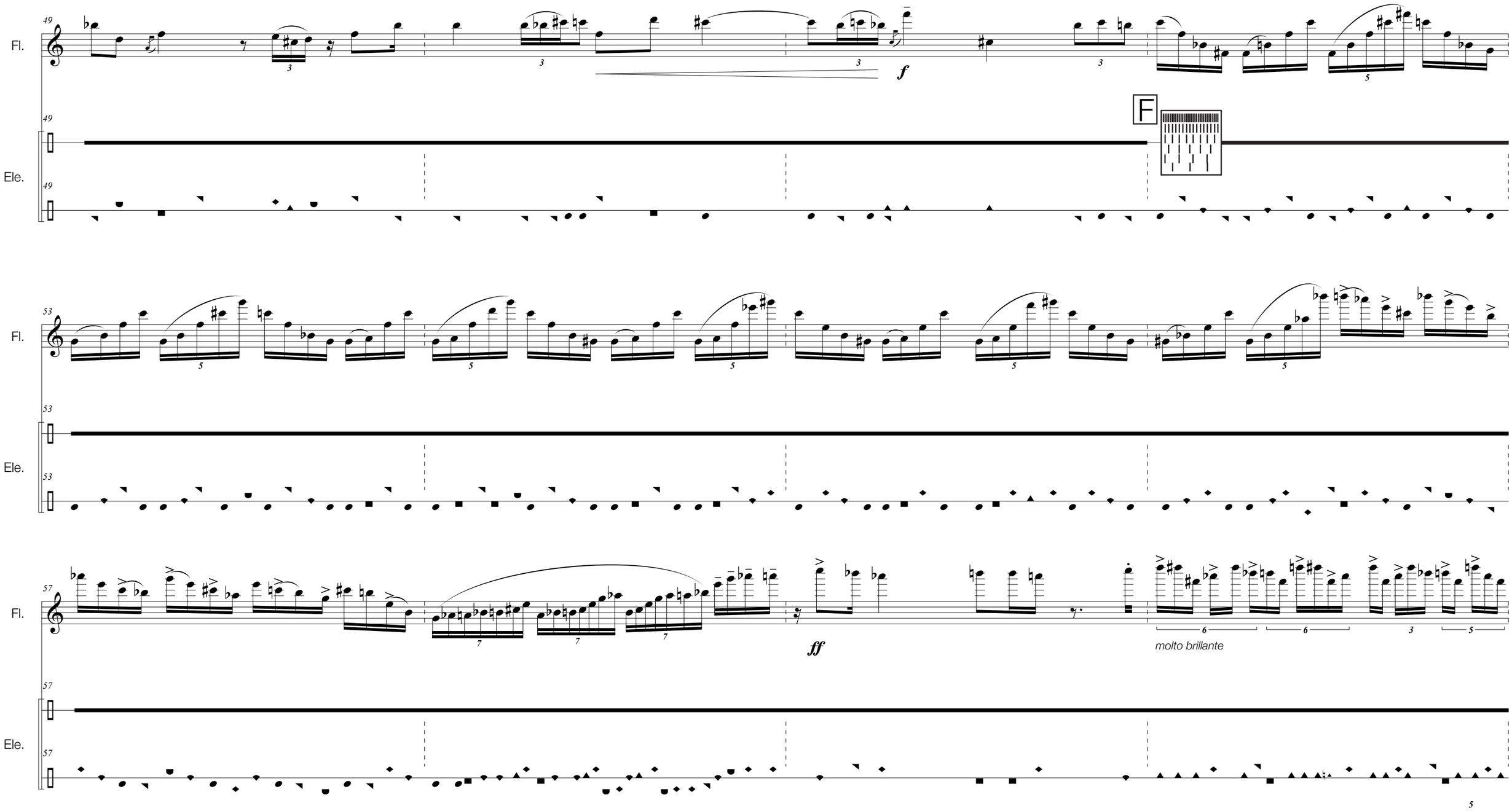
21

Ele.

21


Fl.
Ele.
C
D
ff
p
mf
fff
f


Fl.
Ele.
37
41
45
lirico
mf
E
f
mf cantabile


Fl.
Ele.
F
molto brillante

Fl.

Ele.

61

65

69

fff

f

Fl.

Ele.

73

G

ff *mp* *f* *mf* *ff* *f* *mp*

77

H

mf *f* *al niente*

al niente

www.materialssoundmusic.com