THE 2ND PIETRO BARACCHI CONFERENCE

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Nano-satellites for high energy astrophysics and fundamental physics

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A distributed instrument, such that consisting of nano-satellites carrying simple X-ray detectors, can provide accurate (down to a few arcmin) and prompt (within minutes) localisation of high energy transients, such as gamma ray bursts and the electromagnetic counterparts of gravitational wave events. In addition, once the position of the transient is computed, the signals registered by the different detectors can be realigned in time and added together to improve the statistics. This can allow the investigation of the temporal structure of transients down to the microsecond, providing crucial information on one hand on the physics of the transient inner engine, and, on the other hand, on the granular structure of space-time, through the study of light-travel effects.

The advantages of a distributed instrument based on nano-satellites are: a) modularity, which allows redundancies with the associated lower risks; b) the possibility to expand (and/or improve) the experiment with the time; c) low cost and quick development.

I will present the HERMES Pathfinder project, recently funded by the Italian Space Agency and by a H2020-SPACE grant, which foresees the deployment of a first constellation of six nano-satellites the first years of the next decade, and discuss the synergies with the SkyHopper project.

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