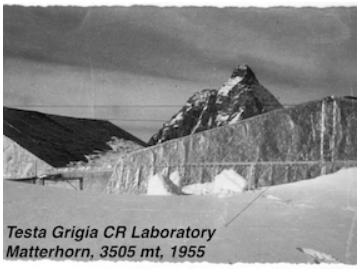

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The space road to UHECR studies in the large exposure era: JEM-EUSO and its pathfinders

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Ultra-high-energy cosmic rays (UHECRs) stand as one of the pillars of the rapidly developing multi-messenger strategy for high-energy astrophysics and astroparticle physics. JEM-EUSO is currently the most advanced international project aiming at a significant increase in exposure for the study of UHECRs. As a space-based instrument, it will allow for the first time a full-sky coverage with identical exposure and experimental performances, which appears key to investigating individual sources as well as large scale anisotropies, disentangling possible differences between the Northern and Southern hemispheres, and uniformly characterising the UHECR sky where a limited number of sources are likely to contribute a large fraction of the observed flux. After the success of the EUSO-Balloon flight and the operation of the EUSO-TA instrument, which confirmed the relevance of the EUSO technology, two important pathfinders are expected to be launched in 2017: a long duration Super-Pressure-Balloon flight of the EUSO-SPB instrument (under NASA's leadership) and the mini-EUSO instrument, to operate from inside the International Space Station (under ASI and ROSCOSMOS leadership). The results, objectives and key features of these missions will be presented, together with the prospects of the longer term JEM-EUSO program.

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