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RADEM, a Radiation Hard Electron Monitor for the JUICE mission

The ESA next class-L mission to the Jovian system, JUICE, the Jupiter Icy Moons Explorer, will collect valuable data while orbiting Jupiter and three its moons for a period of three and a half years. RADEM, the Radiation Hard Electron Monitor is being developed to provide housekeeping information. It will also provide valuable scientific data on the energetic radiation environment of the Jovian system for the full mission duration. The Jovian radiation environment, dominated by electrons, results from Jupiter's gigantic magnetic field and its interaction with its moons and it is extremely hazardous and complex. So far, only the Galileo spacecraft performed long-term measurements of the Jovian radiation environment.
RADEM features three detector heads: the Proton and Ion Stack Detector with two copper collimators. The first one is surrounded by 8 Si sensors separated by increasingly thicker aluminum and tantalum absorbers, to measure protons from 5 to 250 MeV and the second by 2 Si sensors to measure ion species; the Electron Stack Detector consists of a single copper collimator surrounding 8 Si sensors tailored to measure electrons from 0.3 to 40 MeV; and a Directionality Detector , in which a single copper torus with 28 apertures, each leading to an individual Si sensor, to measure 28 directions with a field-of-view close to 2π str to correct for electron flux angular dependences. In this work, RADEM overall properties and Engineering Model calibration results are shown.

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