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The PRIMA instrument onboard of the Swedish Prisma mission

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The PRIsma Mass Analyzer (PRIMA) is a technology test of new type of a miniature time-of-flight ion mass analyzer for low energies (<100eV/q). The PRIMA design is based on the Solar Wind Monitor (SWIM) flown on Chandrayaan-1 but employs micro-electro mechanical system (MEMS) shutters and a newly developed compact type of electrostatic gating system to generate the start signal for the time-of-flight measurement. PRIMA also contains its own digital processing unit and power subsystem. Flown on the Swedish Prisma mission, PRIMA is the first ever space-flight test of a MEMS system for particle detection.
Further PRIMA objectives included flight qualification of a cost effective high voltage opto-coupler, verification of the commercial off the shelf (COTS) approach in component selection and on-board software development, all of which were completed successfully.
We focus on the performance and comparison of the PRIMA gating system and MEMS shutters for ion mass identification in space and discuss the main advantages and disadvantages.