The Deep Space Gateway is a crewed platform that will be assembled and operated in the vicinity of the Moon by ESA and its international partners in the early 2020s and will offer new opportunities for fundamental and applied scientific research. The Moon is a unique location to study the deep space plasma environment, due to the absence of a substantial intrinsic magnetic field and the direct exposure to the solar wind, galactic cosmic rays (GCRs) and solar energetic particles (SEPs). However, 5-6 days each orbit, the Moon crosses the tail of the terrestrial magnetosphere facilitating the in-situ study of the terrestrial magnetotail plasma environment as well as atmospheric escape from the ionosphere. When back outside of the magnetosphere, a variety of these and other phenomena, e.g. those driving solar-terrestrial relationships, can be investigated through remote sensing using a variety of imaging techniques. Most importantly, the lunar environment offers a unique opportunity to study the interaction of the solar wind and the
magnetosphere with the lunar surface and the lunar surface-bounded exosphere. In preparation
of the scientific payload of the Deep Space Gateway, we have undertaken a conceptual design
study for a Space Plasma Physics Payload Package onboard the Gateway (SP4GATEWAY). The main
goal is first to provide a science rationale for hosting space plasma physics instrumentation on the
Gateway and to translate that into a set of technical requirements. A conceptual payload design,
that identifies a strawman payload and is compatible with the technical requirements, is then put
forward. The final outcome of this project, which is undertaken following an ESA AO, is an
implementation plan for this space plasma physics payload package.

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