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Requirements and design of a dual, thermal ion-electron instrument for an outer heliosphere and interstellar mission

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We present the scientific rationale, and ensuing requirements, for the measurement of thermal ions and electrons in the solar wind (including pick-up ions), the inner and outer heliosphere, and the interstellar medium. We place these in the context of the interstellar missions being currently designed in the US and China. From these requirements, we propose an instrument concept that permits to measure both thermal ions (without composition) and electrons, alternatively, with low resources and high signal-to-noise ratio in accordance with the limited resources and large range of count rates, as expected over the course of such a mission.