Hybrid space ship design for interstellar travel with solar sail, nuclear propulsion and mechanism for capture of interstellar hydrogen

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Interstellar travel is hampered by lack of suitable propulsion technologies. In this work, we present the theoretical design of a hybrid space ship. The design combined elements of multiple technologies that can be expected to mature in the next few decades. The design uses a nuclear engine for primary propulsion. There is an apparatus to capture interstellar hydrogen, which can be used as reaction mass in the nuclear engine. The design also incorporates a solar sail that can provide long-term thrust. The solar sail can also be used for braking once approaching another star. Such a hybrid design mitigates the risks and deficiencies associated with each individual technology. We hope that as these individual technologies (nuclear propulsion and solar sails) mature, hybrid designs such as these can provide the basis for the first generation of interstellar spacecrafts. These spacecraft can be robotic or crewed (inter-generational spacecrafts).

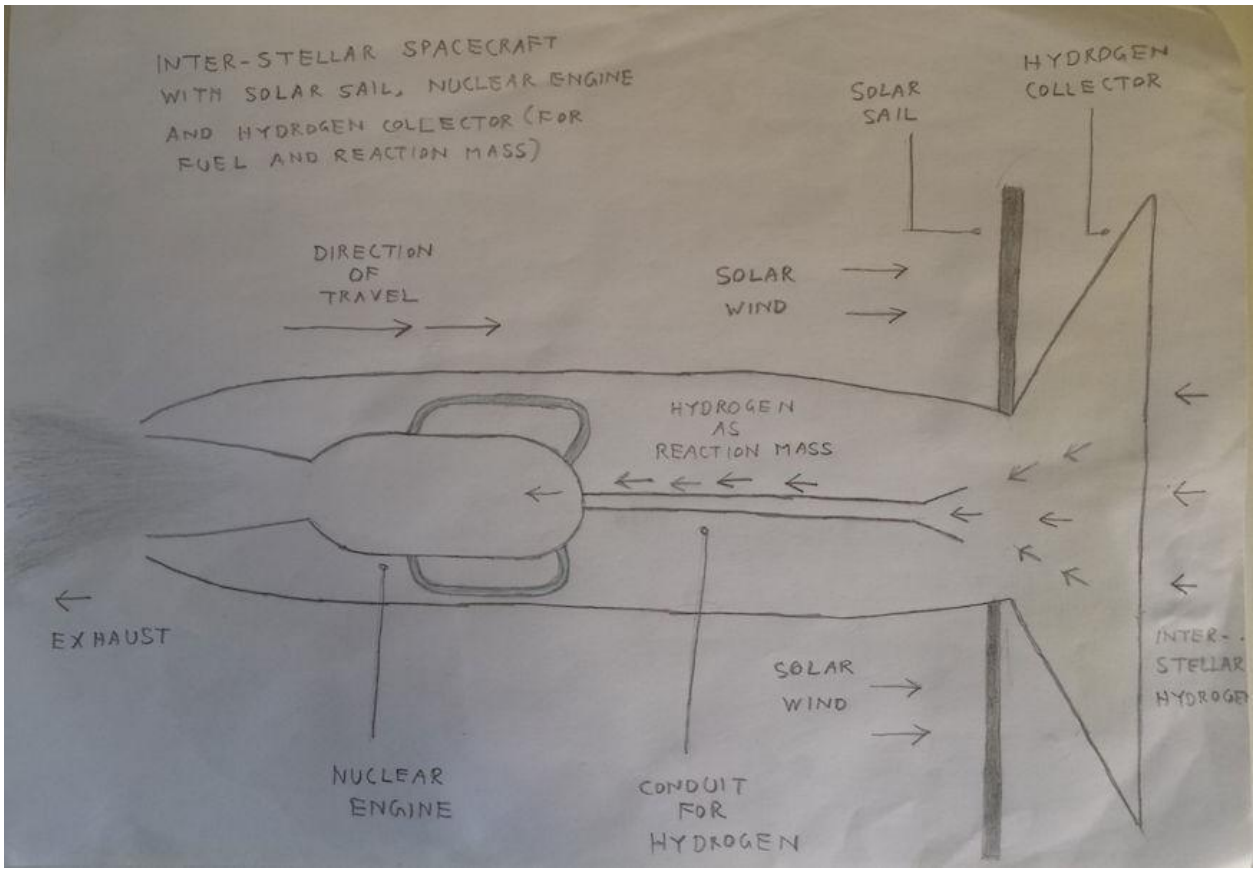

Figure 1. *A schematic of a hybrid space ship with solar sail, nuclear engine and apparatus to capture interstellar hydrogen. The captured interstellar hydrogen will be used as fuel and reaction mass for the nuclear engine. The solar sail will provide long-term propulsion. The solar sail can also be used for braking when approaching another star.*