Paper ID: 23969
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12th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4)
Strategies for Rapid Implementation of Interstellar Missions: Precursors and Beyond (4)

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# UTILIZATION OF GAS CORE REACTOR BASED NUCLEAR PROPULSION FOR AN INTERSTELLAR PROBE

**Abstract**

"Le rêve d'étoiles" or The Dream of Stars has been one of the most fundamental forces of mankind. Since mankind was able to gaze into the stars at the dawn of civilization, he has looked for a way to reach those stars. Unfortunately, due to slow down of technological advancements as well as due to dwindling public support (because of global recession and financial slow down; the prospects for interstellar exploration for the 21st century look grim. There are many exotic types of propulsion methods which have been proposed, but in actuality the only really available and feasible technology that we have currently is nuclear propulsion. While fusion as a nuclear propulsion seems to be promising, the problems related to fusion field containment and the control of the fusion reaction at the levels needed is problematic. One alternative is the utilization of nuclear propulsion using a gas core reactor with 10,000K working temperature, which theoretically allows very high specific impulses as well as high acceleration rates. Especially with non-manned missions, it would allow special acceleration rates which could make interstellar missions feasible from time period of view. The paper will present the method of gas core nuclear propulsion with simulation results, specific impulse calculations as well as a sample calculation for an interstellar flight mission to show its feasibility in terms of energy expenditure as well as a simple cost analysis. The method is certainly within a realm of 2 decades meaning that it can be implemented with a solid 20 year plan with a feasible budget that is doable. The paper will discuss this in detail with some possible recommendations for advancement in the future for interstellar travel possibilities. The paper also will establish a baseline for similar ideas.