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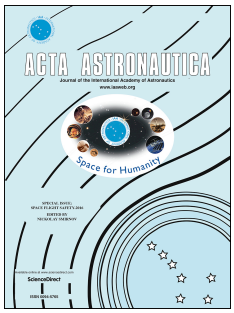

Pros and cons of relativistic interstellar flight

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Pros and cons of relativistic interstellar flight

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Two technological problems must be solved before daring to interstellar flight: fuel and propulsion. The highest energy-density 'fuel' is antimatter in its solid or liquid state and this fuel is likely to be our primary choice for multi-ton relativistic rockets. High-energy ion thrusters powered by annihilation reactors promise superior performance in comparison with direct propulsion by annihilation products. However the power generator onboard can significantly enlarge the rocket dry mass thus limiting the achievable speed. Two physical factors that stand against our dream of the stars are thermodynamics and radiation hazard. Heat-disposing radiator also increases the rocket dry mass. Interstellar gas turns into oncoming flux of hard ionizing radiation at a relativistic speed of the rocket while the oncoming relativistic interstellar dust grains cause mechanical damage. Economy and psychology will play a decisive role in voting for or against the manned interstellar flights.

Keywords; space, interstellar, relativistic rocket, antimatter

I. Introduction

This paper is inspired by an enthusiastic article by D Foley and W. S. Weed published in Discover Magazine, August 01, 2003. The authors advocate the interstellar travel is an enterprise which is relatively "not hard" to perform. In fact, the future of star journeys is not so rosy. The detailed discussion of technical and physical issues regarding the relativistic interstellar flight can be found in [1]. Here we consider rockets with energy source and propellant on board [1] putting aside the concepts of externally powered spacecrafts and discuss shortly the challenges

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