

SPACE PROPULSION SYMPOSIUM (C4)
Advanced Propulsion : Non Chemical, Non Electric (6)

Author: Dr. Gregory L. Matloff
New York City College of Technology, United States, gregmat@hotmail.com

Prof. Roman Kezerashvili
New York City College of Technology, United States, RKezerashvili@citytech.cuny.edu

SOLAR PHOTON SAIL DECELERATION AT ALPHA CENTAURI A

Abstract

Many astrophysicists consider that Alpha Centauri B has a high probability of possessing one or more planetary companions within the habitable zone. The higher luminosity of its companion star Alpha Centauri B as compared with the Sun could be applied to the deceleration of solar-sail starships. The theory of decelerating to parabolic velocity or rest using an opaque solar sail is first developed for an arbitrary star and then applied to Alpha Centauri A. Significant variables include stellar luminosity and mass, sail reflectivity, spacecraft areal mass thickness and sail periapsis at the destination star. For launch from a parabolic solar orbit and deceleration to a parabolic orbit around Alpha Centauri A, if the acceleration and deceleration periapsis are equal, the pre-deceleration interstellar cruise velocity at Alpha Centauri A is about 1.25X the solar-system escape velocity.