

IRAS-based Upper Limit on Dyson Spheres in the Galaxy

Richard A. Carrigan, Jr.
Fermi National Accelerator Laboratory
USA
carrigan@fnal.gov

A Dyson Sphere is a hypothetical construct of a star purposely shrouded by a thick swarm of broken-up planetary material to better utilize all of the stellar energy. A clean Dyson Sphere identification would give a significant signature for intelligence at work just as an archaeological artifact here on earth gives a long-lasting clue to a former civilization. A comprehensive search for Dyson Spheres has been carried out using the 250,000 source data base of the IRAS infrared satellite. The search has used the Calgary data collection of IRAS low resolution spectrograph data to look for fits to black body spectra. Searches have been conducted for both pure (fully cloaked) and partial Dyson Spheres in the black body temperature region $100 \leq T \leq 600$ °K. Other stellar signatures that resemble a Dyson Sphere will be discussed. When these signatures are used to eliminate sources that mimic Dyson Spheres very few candidates remain. Upper limits will be presented for both pure and partial Dyson Spheres. These limits imposes a significant constraint on one class of astroengineering projects since the IRAS search had enough sensitivity to see an infrared object with the power output of the sun over a significant portion of the galaxy.