



Advances in CubeSat Sails and Tethers

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Message from the Guest Editors

Spacecraft size and propulsion are major limiting factors in space mission design. Chemical and electric propulsion require the spacecraft size to be several orders of magnitude larger than CubeSats. The CubeSat Standard in conjunction with the New Space movement have revolutionized the space industry and scientific exploration. CubeSats consist of one or multiple 10×10×10 cm units stacked together in order to achieve the desired mission objectives. With a typical CubeSat mass in the range of 1–10 kg, their propellant storage capabilities are extremely limited if available at all.

Propellantless propulsion systems use an external force to propel the spacecraft, instead of on-board propellant. This can be photon pressure and solar wind originating in the Sun, as well as magnetic field originating in a planet's core or atmospheric particles dragging the spacecraft to a lower altitude. We can employ physical lightsails to reflect photons and travel the Solar System. A similar dragsail can be used in low Earth orbit (LEO) for orbital debris mitigation with deorbiting. Virtual electromagnetic sails can also be generated:





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Message from the Editor-in-Chief

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