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Some variable names in the paper - please use these:

d\_array\_size

D\_sail\_size

lambda\_wavelength

rho\_sail\_density

h\_sail\_thickness

P0\_laser \_power\_in\_main\_beam

P\_optical

P\_electrical\_total\_electrical\_power

m0\_payload mass

m\_sail

m\_total\_mass

c\_speed\_light

L0\_distance\_to\_spot\_size\_equals\_sail\_size

v\_0\_speed\_to\_L0

v\_infinity\_speed\_with\_continued\_illumination

t0\_time\_to\_L0

a\_acceleration

beta

E\_elec\_total\_electrical\_energy\_used\_to\_t0

E\_gamma\_photon\_energy\_in main\_beam\_to\_time\_t0

epsilon\_sub\_r\_reflection\_coef

epsilon\_sub\_beam\_beam\_eff

epsilon\_sub\_elec\_photon\_to\_electrical\_eff

epsilon\_sub\_launch\_eff

epsilon\_sub\_laser\_comm\_beam\_eff

L\_target\_light\_years = distance to target in ly

L\_target\_m= distance to target in meters = 1016\*L\_target\_light\_years

Laser\_comm\_spacecraft\_power\_peak= peak laser comm power in watts

Laser\_comm\_spacecraft\_optics\_size= spacecraft laser comm optical size

lambda\_laser\_comm\_wavelength(nm)

Laser Comm Flux at Earth (ph/s-m^2)= epsilon\_sub\_laser\_comm\_beam\_eff\*

[Laser Comm Spacecraft Transmit Power (w)/(h\*c/( lambda\_laser\_comm\_wavelength)]/{[L\_target\_m\*2\* lambda\_laser\_comm\_wavelength /Laser Comm Transmit Optics Size (m)]^2}

Laser Comm Rate at Earth Received in Array(ph/s)= Laser Comm Flux at Earth (ph/s-m^2)\*[(d\_array\_size)^2]

Laser Comm\_effective\_photometric\_magnitude = -2.5\* log (Laser Comm Flux at Earth (ph/s-m^2)/3x1010)