



# The Long Night: How to Interstellar Flight

Samuel Adrian Antz

December 30, 2024



# Brakes



We're not on the Autobahn. You have to break to deaccelerate.





# Radiators

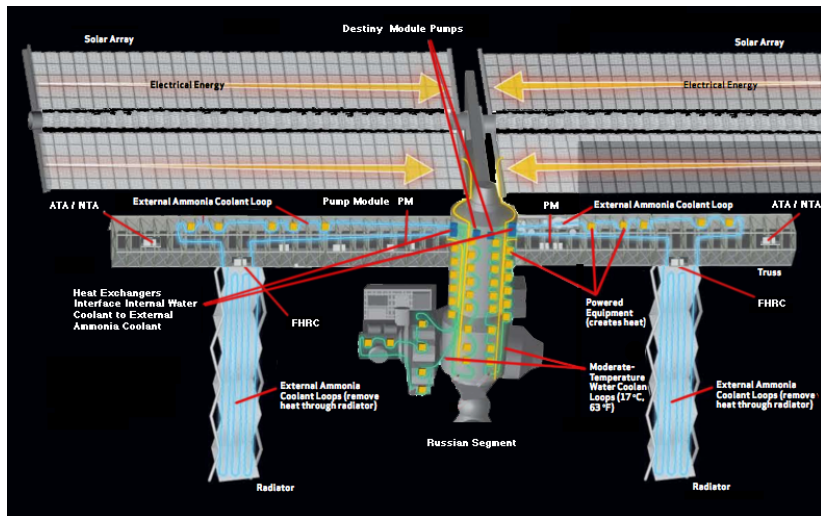


Interstellar spaceships don't need to be aerodynamic or compact.  
But their engines need to have significant size and mass.

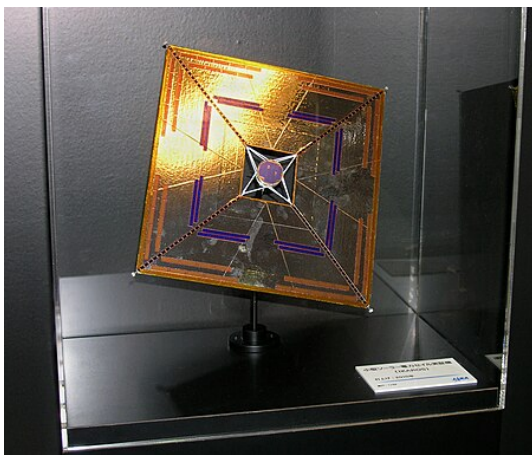
# Radiators



# Radiators



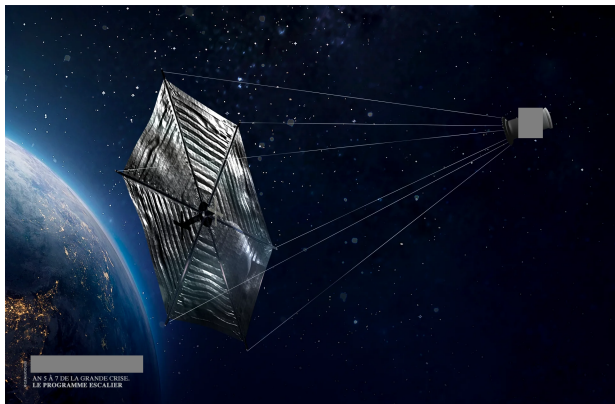
# Solar Sail



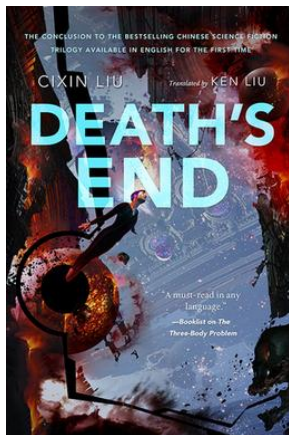
IKAROS 2010



# Solar Sail



## Solar Sail

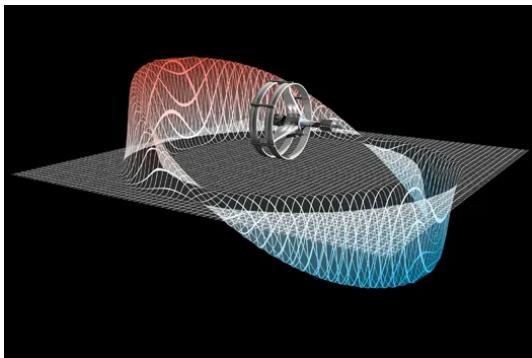


### Liu Cixin's *Death's End*





# Alcubierre metric



Expands spacetime behind ship  
Contracts spacetime in front of ship

Thanks for your attention! :-)

Questions?