

F3B: Predict Solar System Particle Flux

Targeted Outcome: Phase 3- 2025-beyond, Opening the Frontier

Required Understanding

From Phase 2: Understand SW magnetic processes and quantify acceleration in key regions

Determine the plasma populations throughout the Solar System

Understand the source of dominant processes that create energetic particles at the Sun, in interplanetary space and within magnetospheres

Understand transport processes of energetic particles in interplanetary regions in the Solar System

Understand the energization processes across multiscale interfaces that result in acceleration of particles

Enabling Capabilities & Measurements

Remote and in situ particle and field observations of key regions where energetic particles are generated

Develop physics based models that predict particle fluxes within magnetospheres

In situ observations of plasmas within .5 AU that will

Remote and in situ observations in Geospace and other planetary magnetospheres in order to predict particle fluxes

Develop physics based models that predict particle fluxes out to 1.5 AU using solar and innerheliospheric observations

Implementation Phase 3: 2025-beyond

Great Observatory

Assumes launch of ITSP, L1 monitor, SEPP, Auroral Imagers, Solar Sentinels, MTRAP, solar chronograph

Enabling LWS missions

Solar wind mission that quantifies particle fluxes within 1 AU and within Geospace

Contributing LWS Program

Mission that remotely observes the solar source of particles and impact of particles in Geospace

Enabling STP Program

Mission to observe the far side of the Sun

Contributing STP Program

Mission to remotely investigate extraterrestrial magnetospheres

Enabling Flagship mission

Mission to quantify the particle and energy propagation through the solar wind-magnetosphere-ionosphere system

Model/Theory Development - Theory and Modeling program focused on predicting particle flux and populations throughout the Solar System

Potential Discovery

Mission to observe quantify Mercury's magnetospheric particle and plasma populations

Potential Explorer

Mission to quantify the dynamics of and particle interaction across the heliospheric boundary

Other Agencies

US: monitor of geoeffective solar phenomena (chronograph?)