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ΤΜΗΜΑ ΦΥΣΙΚΗΣ

ΣΕΜΙΝΑΡΙΟ

ΤΟΥ ΤΟΜΕΑ ΑΣΤΡΟΦΥΣΙΚΗΣ, ΑΣΤΡΟΝΟΜΙΑΣ ΚΑΙ ΜΗΧΑΝΙΚΗΣ

Θέμα: A novel **For**ecasting system for **S**olar **P**article **E**vents and **F**lares **(FORSPEF)**

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Περίληψη

Solar Energetic Particle (SEP) events resulting from intense eruptive events such as solar flares and coronal mass ejections (CMEs), pose a significant threat for both personnel and infrastructure in stormy space-weather conditions. Of particular concern is the high rate of single event effects on-board spacecraft launchers which can be brought about by large increases in the radiation environment as a result of such solar activity. A new web-based service for the prediction of solar eruptive and energetic particle events is presented. FORSPEF (Forecasting Solar Particle Events and Flares) is designed to perform forecasts and nowcasts of the occurrence and the characteristics of solar flares and SEP events. The service is targeted to launch operators and to the space-weather community. For the prediction of solar flares, an assessment of potentially flaring active-region magnetic configurations is utilized based on sophisticated analysis of a large number of magnetograms of solar active regions. For the prediction of SEP events, a novel reductive statistical scheme is implemented upon a newly constructed database that includes characteristics of SEP events and their parent solar events. The new comprehensive catalogue of SEP events includes solar associations in terms of flare (magnitude, location) and CME (velocity) characteristics, as well as radio burst (Type III and Type II) signatures. The SPE prediction scheme utilizes the output of solar flare forecast, while the SPE nowcast uses real time observations of the solar surface and solar corona. We present and discuss the architecture of the prediction tools integrated in the FORSPEF service as well as the outputs related to the warning of possible solar flares and the prediction of the onset, flux profile and duration of SEP events. The FORSPEF web-based service is expected to be fully operational within the following months.
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