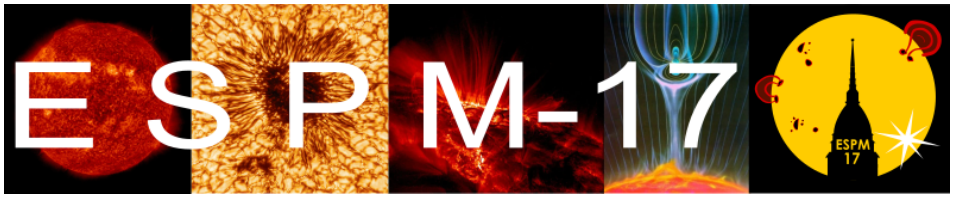

Contribution ID: **193** Type: **Poster**

Solar Flare Forecasting Utilizing Deep Survival Analysis

Solar flares and accompanying coronal mass ejections are drivers of intense space weather, which can have major impacts on e.g., satellite communication, navigation, and power-grid integrity. To this day, precise predictions of solar flare events remain challenging, due to the complexity of the underlying physical processes. This study aims to improve solar flare forecasting through the application of survival analysis, a method traditionally used in fields like medicine and economics to model the timing of events and their related data features. In extension to previous studies, we aim to model not only the likelihood of a flare happening within the next few days but also its timing.

We demonstrate the time-to-event prediction capabilities of deep survival neural networks based on multivariate time series extracted from solar photospheric vector magnetograms in Spaceweather HMI Active Region Patch (SHARP) series.

Preliminary results indicate that deep survival analysis provides a promising new avenue for more precise event time predictions of solar flare outbursts. We found that including active regions that produce multiple flares in both training and validation sets, while keeping the flares themselves separated, yields highly accurate predictions with hour-level precision.

Primary author: MEYER ZU WESTRAM, Moritz (Astronomical Institute, University of Bern)

Session Classification: Coffee break and poster session 2

Track Classification: Multi-scale energy release, flares and coronal mass ejections