

## Study on the predictability of imminent giant solar flares based on the theory of double-arc instability

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Solar flares are catastrophic explosions in the solar corona and sometimes may cause a severe space weather disaster in geo-space and the infrastructure. Although many efforts have been taken for understanding and predicting the onset of solar flares, it is still difficult to accurately predict when, where and how large giant solar flares will occur. Here, we propose a new type of solar flare prediction scheme called the  $\kappa$ -scheme. The  $\kappa$ -scheme is the totally physics-based prediction, and it is capable of providing the information of the location as well as the energy of imminent giant solar flares. The prediction is performed by evaluating how small reconnection can trigger the onset of the double-arc instability, which was recently proposed as the initial driver of solar flares by Ishiguro and Kusano (2017), using the nonlinear force-free field extrapolation. We carried out the analysis of more than 200 active regions in the solar cycle 24 by applying the  $\kappa$ -scheme to the SDO/HMI data. The result shows that most of the imminent giant solar flares larger than the GOES X2 class are predictable with the  $\kappa$ -scheme.

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