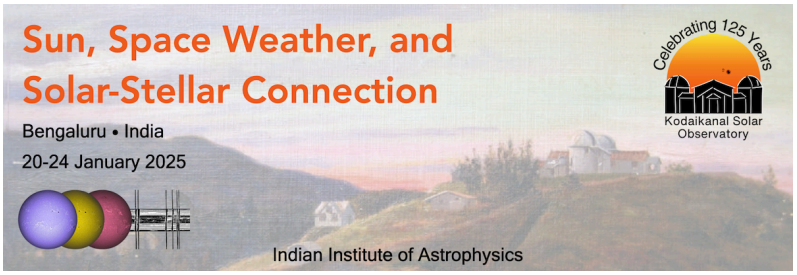


Contribution ID: **23** Type: **Poster**

# Analyses of Features of Magnetic Cycles at Different Amounts of Dynamo Supercriticality: Solar Dynamo is About Two Times Critical

The growth of a large-scale magnetic field in the Sun and stars is usually possible when the dynamo number ($D$) is above a critical value $D_c$. As the star ages, its rotation rate and thus $D$ decrease. Hence, the question is how far the solar dynamo is from the critical dynamo transition. To answer this question, we have performed a set of simulations using Babcock–Leighton type dynamo models at different values of dynamo supercriticality and analyzed various features of the magnetic cycle. By (i) comparing the recovery rates of the dynamo from the Maunder minimum and statistics (numbers and durations) of the grand minima and maxima with that of observations and (ii) modeling the amplitudes of the last five solar cycles using the observed polar field, we show that the solar dynamo is only about two times critical and thus not highly supercritical. The observed correlation between the polar field proxy and the following cycle amplitudes and the Gnevyshev-Ohl rule are also compatible with this conclusion.

## Contribution Type

## Theme

Solar Magnetism over Long-Time Scales

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