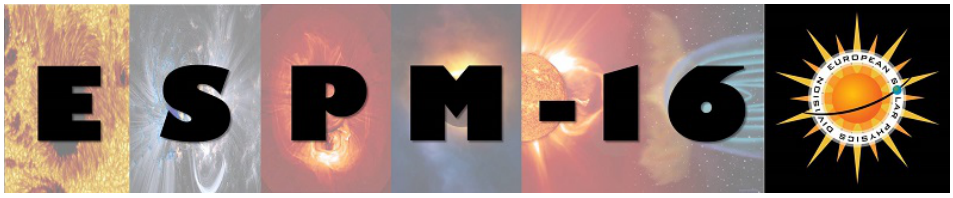

Contribution ID: **500** Type: **Talk**

Babcock-Leighton solar dynamo models including the observed meridional circulation and surface flux loss

Monday, 6 September 2021 09:45 (15 minutes)

What sets the 11-year period of the solar activity cycle? Why do sunspots appear in the butterfly wings which propagate equatorward over the course of a cycle? The Babcock-Leighton flux-transport model attempts to answer these questions but has free paramters. Some of these free parameters have recently been observationally constrained. In particular, the meridional flow has recently been determined by Gizon et al. and the toroidal flux loss through the solar surface has been shown to remove most of the flux produced by the Omega effect. We show that the Babcock-Leigton FTD model can produce solar like solutions with these new constraints. We also show that the remaining parameters (mainly radial magnetic pumping and turbulent diffusivity) can produce butterfly diagrams similar to the Sun's without artificial restrictions of the emergence latitude. The basic mechanism here is that the toroidal field is quickly transported to the bottom half of the convection zone where the meridional flow is equatorward. Thus the Babcock-Leighton FTD model remains an extremely promising candidate for how the Sun's dynamo actually works.

Student poster?

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