Magnetic flux emergence from the solar case to giants.

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Abstract

In the case of the Sun and more so in the case of other stars with convective envelopes, the origin of the surface magnetic fields is not fully understood. Currently, the most promising candidate to explain this activity are "buoyant magnetic flux tubes" generated by a dynamo mechanism. They are expected to rise from the deep interior up to the surface forming so-called omega-loops to finally end up at the surface in the shape of stellar spots. These rising magnetic flux tubes have been extensively studied in the solar convection zone. However, since some magnetic observations have been made for other types of stars, we believe that it is time to apply what we learned from the Sun to other stars and challenge our theoretical models. We are investigating magnetic flux emergence with realistic rotation profiles for the Sun and theoretical rotation profiles for giants. We are especially interested in the influence of differential rotation on the emergence latitudes of flux tubes. This talk will report on the progress made with our nonlinear simulations in compressible spherical shells.

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