

# Dynamo action sustaining turbulence : a subcritical transition

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Dynamo action in a stably stratified environment has been observed for the first time in global numerical simulations quite recently [1]. The so-called Tayler Spruit dynamo interestingly exhibits a strong level of turbulent fluctuations, turbulence which can be maintained up to very low levels of differential rotation. By varying the magnetic Prandtl number, we show that the relevant criterion for this dynamo is a constant magnetic Reynolds number, compatible with previous predictions [2]. Besides this very general result, the simulations seem to suggest that the mechanism at hand is a subcritical transition to turbulence, transition which can be described by a dynamical system involving only three modes. In very good agreement with the direct numerical simulations, this dynamical system offers a more general scenario for a subcritical transition to turbulence, which could also apply to other types of instabilities, such as magneto-rotational instability.

## Références

1. L. PETITDEMANGE, F. MARCOTTE, C. GISSINGER, *Hidden dynamo spins down radiative stars*, ( *Science*, 2023)
2. H.SPRUIT, *Dynamo action by differential rotation in a stably stratified stellar interior*, ( *A.A.*, 2002)