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Dynamo action in penetrative Boussinesq convection¹

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Dynamo action in any highly turbulent, electrically-conducting fluid medium is plausible. Dynamo amplification of the magnetic fields on the scales of the velocity patterns might be expected if the effects of diffusion and packing of fields are not too drastic. An interesting question is whether magnetic fields can be generated on scales *larger* than the velocity scale. We investigate the generation of magnetic fields in a Boussinesq convecting layer, and examine the effects of including a convectively-stable layer of fluid below, of rotation, and of adding a forced shear. We examine the efficiency of the dynamo and the relative production of small-scale and large-scale magnetic fields.

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