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Recent and future experiments on dynamo action, magnetorotational instability, and Tayler instability

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Precession has long been discussed as a complementary energy source for homogeneous dynamo action. Here we describe the present status of the preparations - theoretical predictions, velocimetry of a scale model water experiment, and engineering/construction concerns - for a liquid sodium precession experiment. Furthermore, we report recent experimental and theoretical results on the magnetorotational (MRI) and Tayler (TI) instabilities, and discuss plans for a large-scale liquid sodium experiment to study the combination of MRI and TI.