

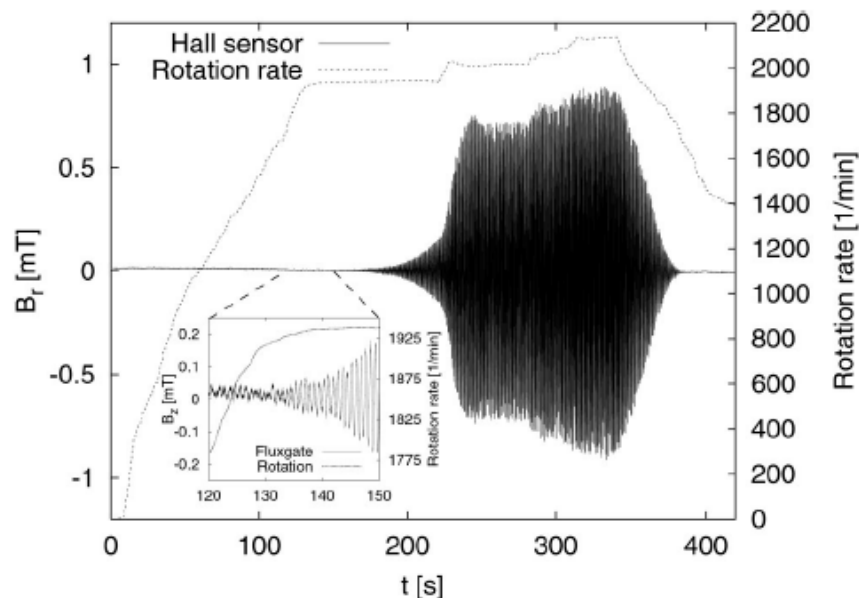
## Laboratory Plasma Astrophysics Highlights at 45<sup>th</sup> APS DPP Meeting

### 1. First Dynamo Experiments: Generating Magnetic Field from Motion

The generation of a magnetic field from electrically conducting fluids, plasma or liquid metal, is known as the dynamo problem. The dynamo was proposed to explain the existence of cosmic magnetic fields, and it has been an outstanding puzzle for plasma physics and astrophysics for decades if not centuries. Dynamo theories and more recently powerful computer simulations have made headway in the research, but experimental demonstration of the generation of a magnetic field from motion has been lacking. After many efforts over past half century, laboratory demonstrations have been successful only recently. One of these successes will be presented in the DPP meeting by Dr. Agris Gailitis from Riga of Latvia (CI1.003). By carefully setting up a desired flow of liquid sodium, a growing magnetic field from a small seed field was observed when the flow speed is increased, see picture attached below. Many interesting physics questions, such as saturation mechanisms for magnetic field, are now under investigation experimentally. Other related liquid metal experiments will be also discussed in the mini-conference on “Laboratory Plasma Astrophysics”.

#### References

- A. Gailitis et al., PRL 84, 4365 (2000)
- A. Gailitis et al., PRL 86, 3024 (2001)
- A. Gailitis et al., RMP 74, 973 (2002)



Generation of magnetic field when speed of a liquid metal flow is increased at the Riga experiment.