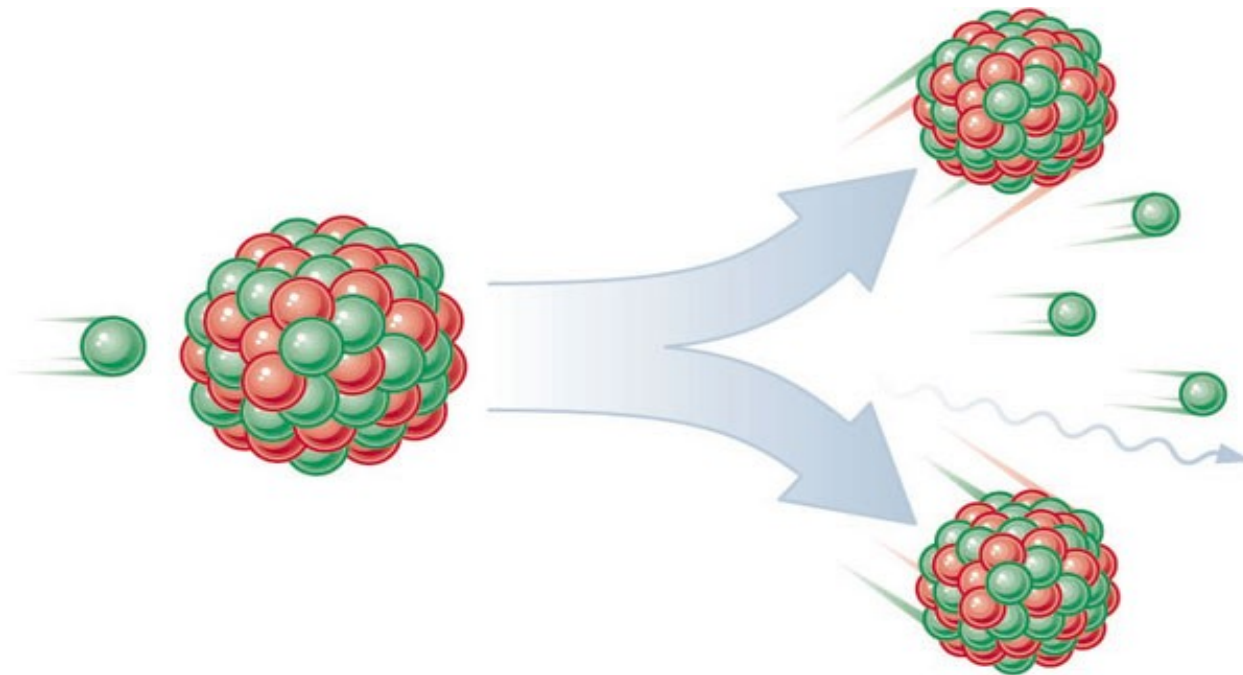# Fission dynamics investigated in complete kinematics measurements

Diego Ramos on behalf of J.L. Rodríguez-Sánchez
and the SOFIA collaboration

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SOFIA (Studies On FIssion with Aladin)

H. Alvarez-Pol, L. Audouin, Y. Ayyad, J. Benlliure, G. Belier, E. Casarejos, A. Chatillon, D. Cortina, A. Heinz, T. Gorbinet, A. Kelic-Heil, B. Laurent, J.F. Martin, C. Paradela, E. Pellereau, B. Pietras, D. Ramos, J.L. Rodríguez-Sánchez, C. Rodríguez-Tajes, D.M. Rossi, H. Simon, J. Taieb, J. Vargas

Motivation
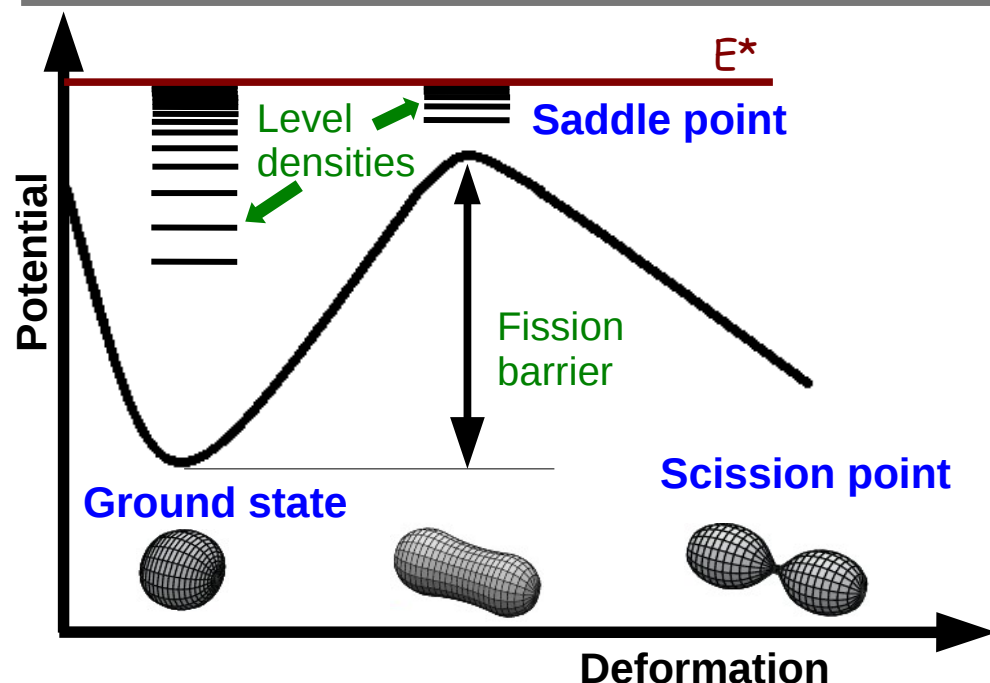
The description of the fission dynamics along the nuclear potential landscape depends on different parameters, such as:

- Fission barriers
- Nuclear level densities
- Viscosity of the nuclear matter

To constrain these parameters, we propose to investigate the fission dynamics by using complete kinematics measurements of the fission fragments and light-charged particles emitted simultaneously
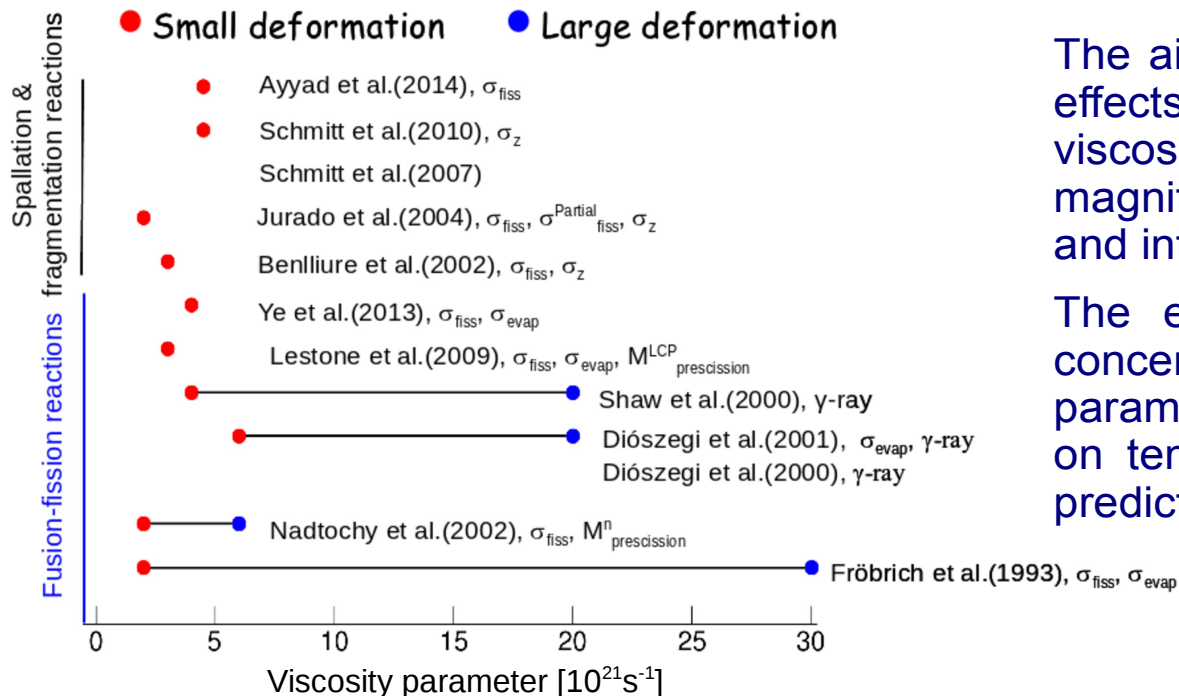
The aim of this work is to study the dissipative effects in fission. In particular, the value of the viscosity parameter that quantifies the magnitude of the coupling between collective and intrinsic degrees of freedom

The existing studies predict different results concerning to the value of the viscosity parameter. Some works point out dependences on temperature and deformation, while others predict a constant value

The SOFIA experimental setup represents the state-of-the-art detectors concerning to the investigation of fission in the world
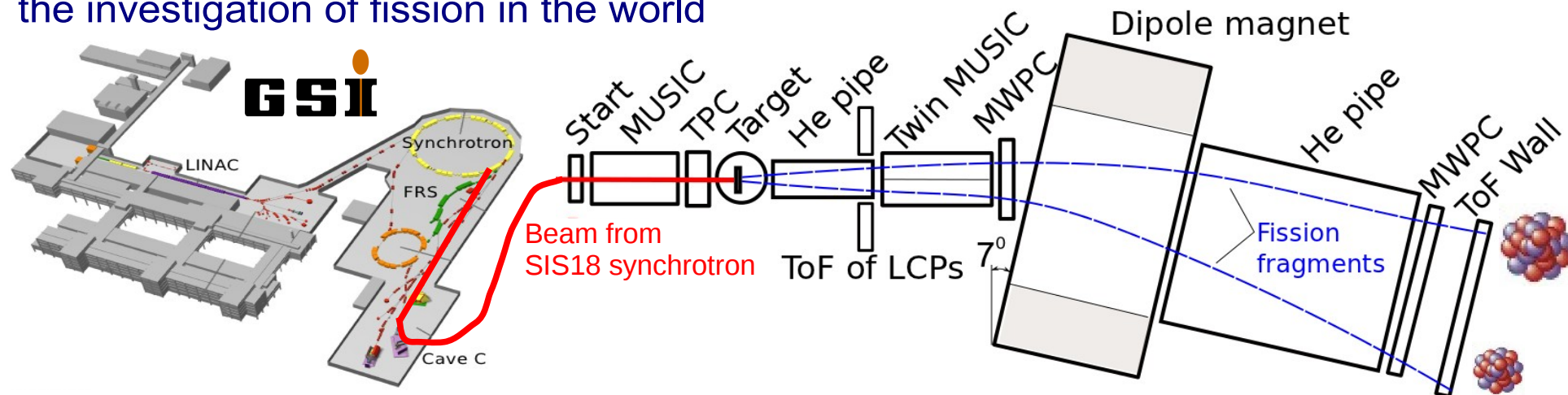
This setup provides us for the first time a complete identification of both fission fragments (A, Z,TKE) and light-charged particles emitted simultaneously

● Critical paremeters:

- Energy-loss resolution ~ 1.2 %

- Large acceptance dipole magnet

- Position resolution ~ 200 μm

- Time-of-flight resolution ~ 40 ps

- Limited straggling (helium)
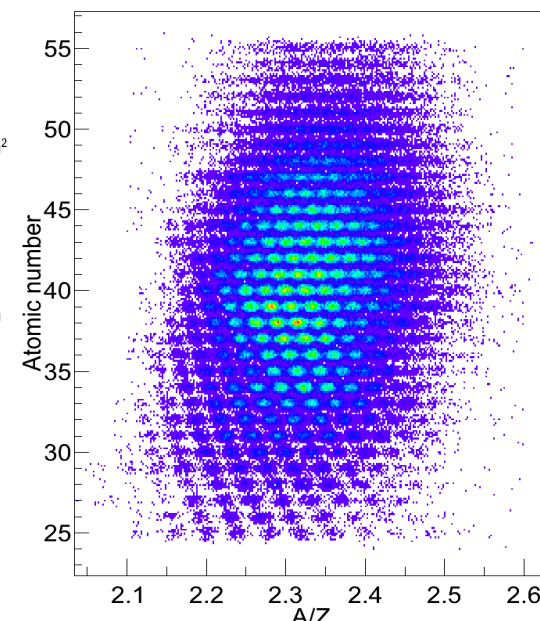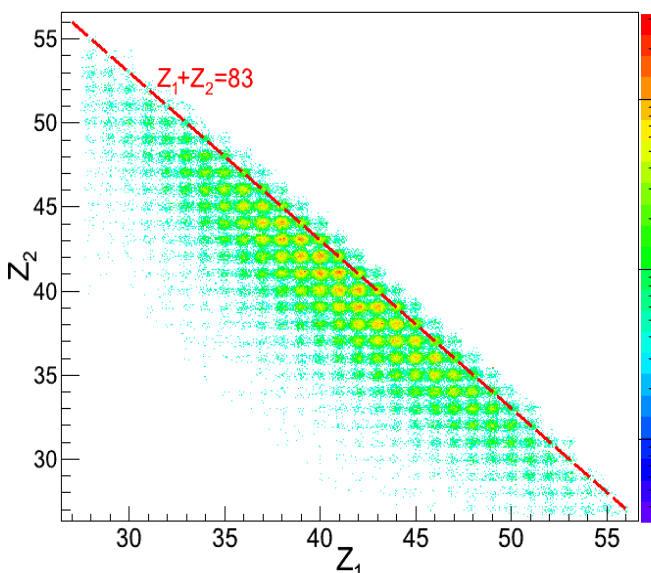
The new experiment allows us to obtain the most used observables in other works with high efficiency, as well as new observables sensitive to the dynamics at small and large deformations