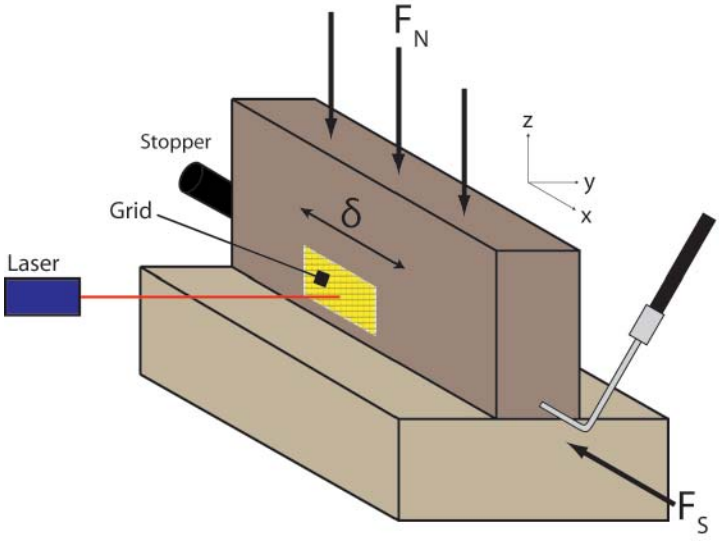
PREDICTING EARTHQUAKES

Researchers at the Hebrew University of Jerusalem have been studying the dynamics of frictional sliding of rocks along seismic fault lines. Their results are providing fundamental new insights into how frictional strength evolves throughout the stick-slip cycle.*

The experimental setup used PMMA blocks with the contact surfaces machined to ~1 µm (r.m.s.).



At the beginning of each experiment normal loading F_N was applied to the top block and shear loading F_S applied to the base block which was mounted on a low friction stage. Base block motion was only constrained by the frictional coupling to the top block via the contact interface.

A laser was used to measure local slip, δ. Philtec's analog displacement sensor **model D12-H2T4** was used to monitor slip at the top block's leading edge to better than 0.5µm accuracy at a measurement rate of 250,000 samples/sec.

Philtec's sensor was chosen for this project because:

- It is non-contact
- The small 90° tip simplifies fixturing
- The measurement range of the D12 is perfect for the expected displacements
- A bandwidth of 1 megahertz was needed to 'see' the stick-slip phenomena

* Ben-David, O., Rubinstein, S.M., Fineberg, J. Slip-stick and the evolution of frictional strength. *Nature* **463**, 76 - 79, 2010