



## Masterarbeit Astronomie, Gruppe Spaceweather:

### Design of a Flare Spectrograph

#### MOTIVATION

Solar flares are extremely powerful eruptions that on Earth can cause aurorae, power outages, and problems with satellites. However, high-resolution observations of flares are difficult because a solar telescope usually only sees a few percent of the Sun and the unpredictable flares may occur outside of the field of view.

Spectra encode the physics of objects. For example, from solar and stellar spectra one can derive the temperature, density, velocities, and magnetic fields on stars. Flare spectra, especially over the visible part of the spectrum, are rare because of the above mentioned observational difficulties. But they would be highly interesting in order to understand the physics of flares better. The goal of this project is to design a new instrument that will be optimized for observations of solar and stellar flares.

#### TASKS

- Learn the theory on spectroscopy, astronomical instrumentation, and observations.
- Understand fiber-fed spectrographs, their advantages and drawbacks.
- Using an optics design program (Zemax), test various potential designs of a flare spectrograph
- Write a feasibility study on the different designs
- Depending on the progress, there are options to start building the spectrograph, to visit labs that build astronomical instrumentation, or to join observations at telescopes.

