

GYRSAMM

GYula Solar Magnetic Activity
Monitor Solar Telescope

Framework



- Plastics
- Design and creation of printing moulds for plastics
- Metalworks

Mr. Luciano Dal Sasso

Creates brand for high-end astronomy



- High-end products:
- telescope mounts
 - GoTo systems
 - supports and accessories
 - Merlino Portable Remote Observatory



**Italian National Institute
for Astrophysics
–
Rome Astronomical
Observatory**

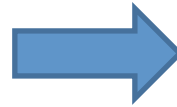
**Scientific counselor for
the project:**

- **software development
of MOF part;**
- **MOF development;**
- **tests.**

The SAMM instrument

Synoptic solar telescope based on Magneto Optical Filter (MOF) technology

MOF technology



**Dopplergrams
Magnetograms**

**Fixed wavelength but high stability
and sensitivity**

Synoptic



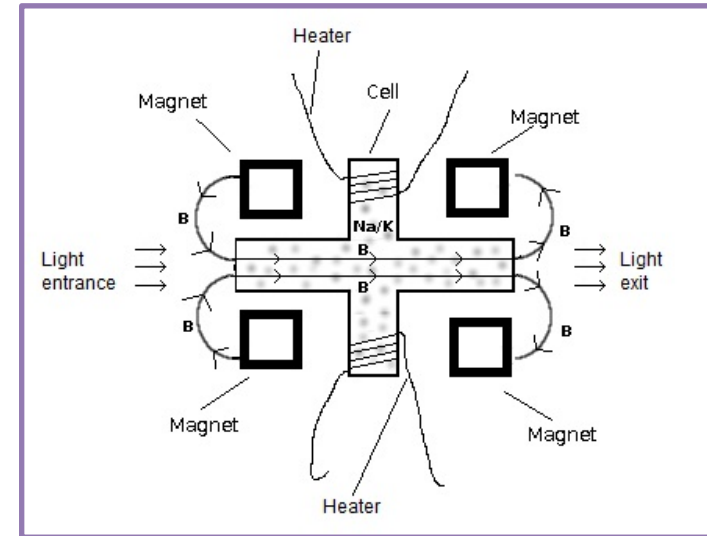
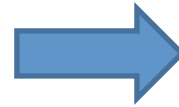
**2 observation lines at 2 altitudes in
the solar atmosphere:
Na D2 (600-700 km)
K I (300-400 km)
Future: Ca I (1000 km), He 1083 A**

**Full-disk or near-full-disk monitoring
of solar activity**

MOF filters

Concept: prof. A. Cacciani (1968)

MOF cell: a glass cell containing a vapourised element (Na, K,...) immersed in a strong longitudinal magnetic field



Zeeman effect
Macaluso-Corbino effect
Righi effect



Splitting of absorption lines
and (opposite circular)
polarisation of the two
components

2 MOF cells + prefilter +
polarisers + waveplates:



dopplergram/magnetogram
in 1 absorption line

Past projects

A few MOF telescopes have been built and deployed in the past.

Generally very good MOF cells...

... but rest of construction has often suffered from less than ideal manufacturing.

And yet...

Performance

Jefferies et al. have deployed MOF telescopes in Antarctica.

Telescopes suffered from mechanical stresses and underperforming optical train

Magnetograms

5 G sensitivity with 5 s integration time

2 G sensitivity with 45 s integration time

Dopplegrams

Antarctica: low tangential velocity on Earth's surface =
best case: 10 cm/s sensitivity

Lower latitudes: higher tangential velocity =
worst case: 1 m/s sensitivity

Putting the numbers into perspective...

Magnetograms

MOF ground-based telescope

2-5 G sensitivity

HMI on SDO satellite

8-15 G official sensitivity

Dopplegrams

MOF ground-based telescope

Worst case: 1 m/s sensitivity

Scientific requirements

10 m/s sensitivity