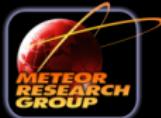


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L. Ferracina, L. Marraffa, N. Bartholomae, I. Latorre



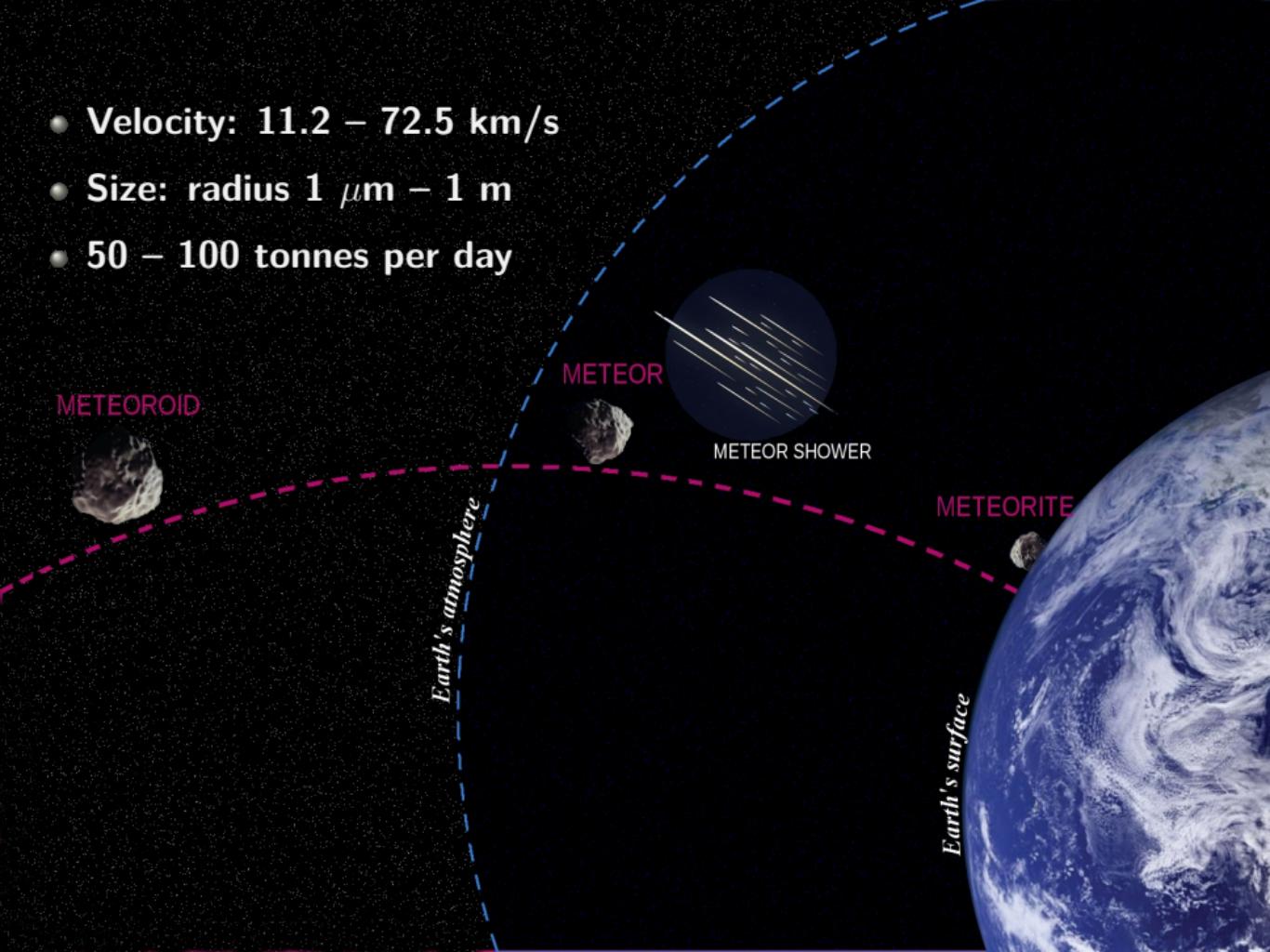
SPECTRAL OBSERVATION PROGRAM



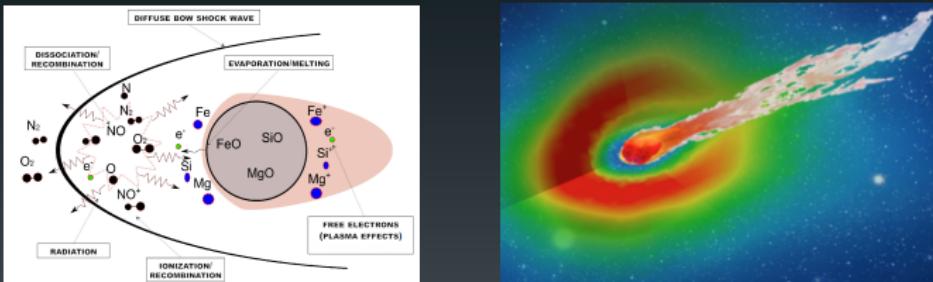


<https://www.youtube.com/watch?v=FY0vjbBp4eg>

- Velocity: 11.2 – 72.5 km/s
- Size: radius 1 μm – 1 m
- 50 – 100 tonnes per day



Superposition of two components with different temperatures:



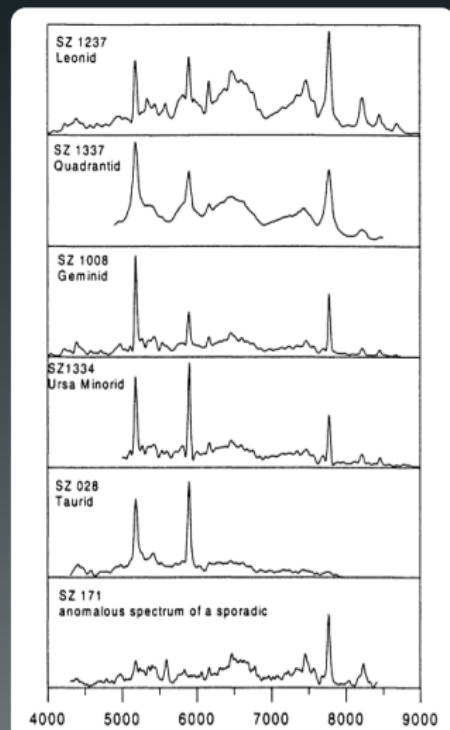
- The main component (≈ 4500 K)
 - present in all spectra
 - originates from a relaxed vapor cloud near and behind the meteoroid
- The second component ($\approx 10\,000$ K)
 - present in bright and fast meteors
(vapor lines – air lines present also in faint fast meteors)
 - originates from a transition zone in the front of the vapor cloud

Depends on:

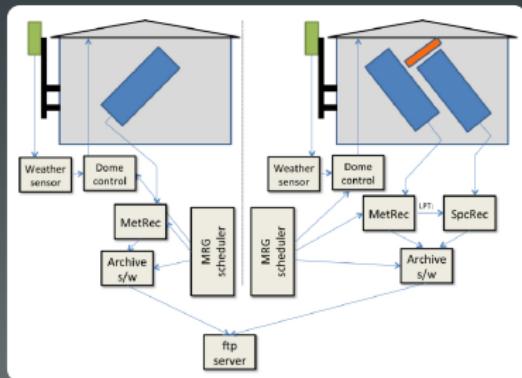
- Meteor velocity.
- Brightness.
- Composition.
- Height in the atmosphere.

Observed:

- Main: **Mg I**, **Na I**, and **Fe I**
- Moreover: Ca I, Cr I, Ca II, Mg II, Si II, H I, Fe II, Cr II, FeO, MgO, SiO, ...
- Atmospheric: O I, N I, N₂



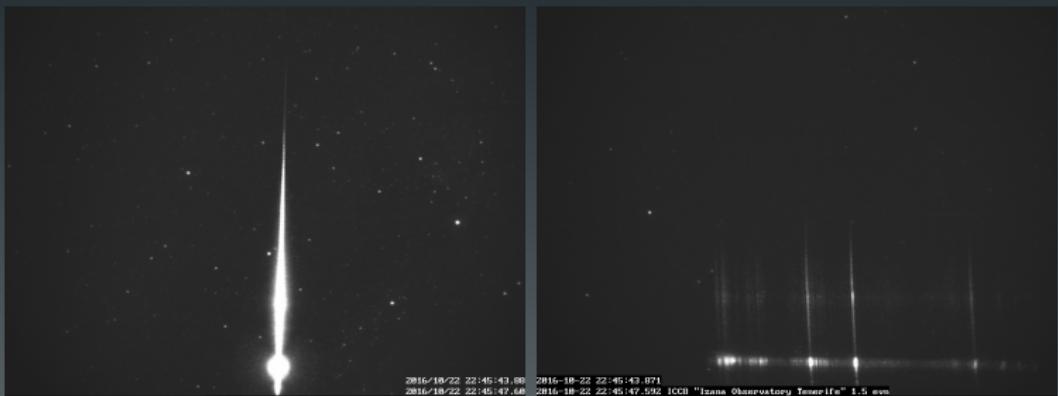
- first station: 2011,
- automated system,
- image-intensified video cameras,
- photometry & spectroscopy.



- first science: 2014,
- limiting mag. +7,
- accuracy 1',
- 800-2000 meteors/month,
- a few tens of spectra.



MESS (MEteor Spectra Selector)



ICC7

ICC8



MESS (MEteor Spectra Selector)



ICC7

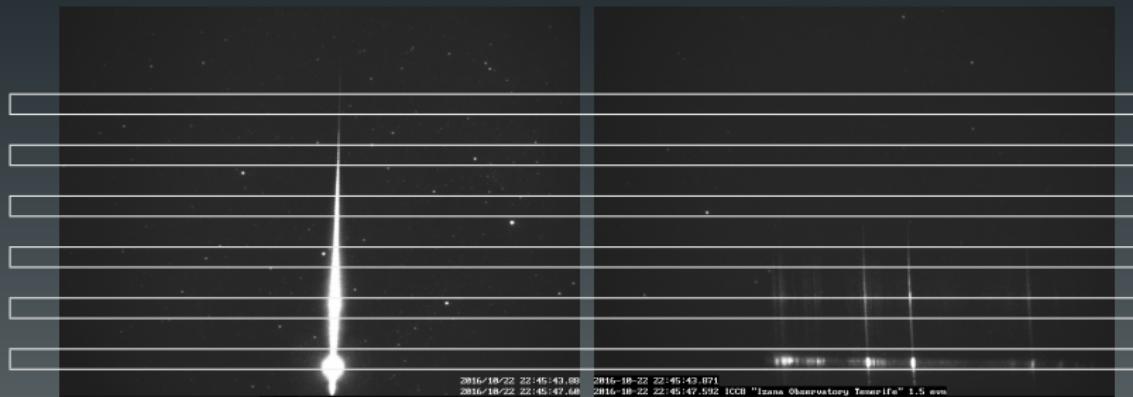


ICC8

2016-10-22 22:45:43.09
2016-10-22 22:45:47.60
2016-10-22 22:45:43.071
2016-10-22 22:45:47.592 ICCB "Izana Observatory Tenerife" 1.5 evn



MESS (MEteor Spectra Selector)

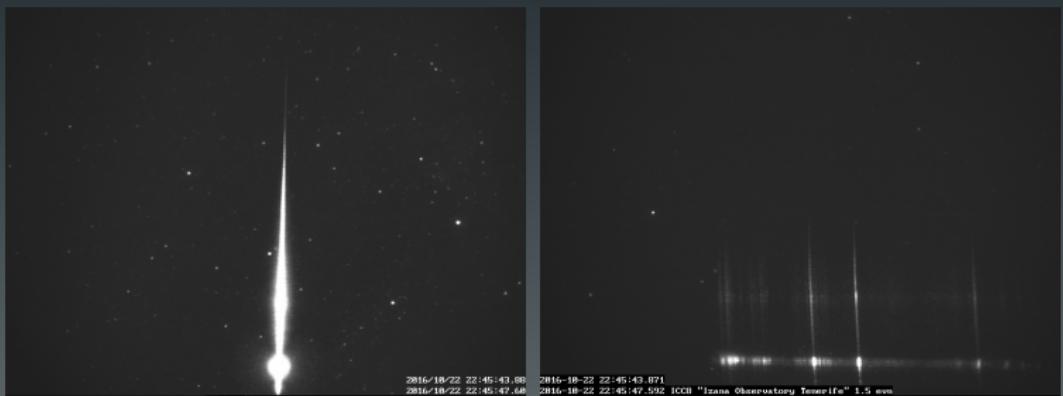


ICC7

ICC8



VIDAS – VIdeo Archiving System



ICC7

ICC8



VIDAS – VIdeo Archiving System

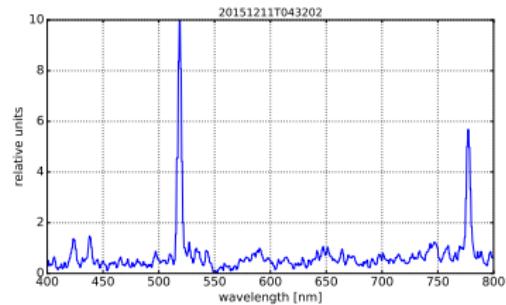
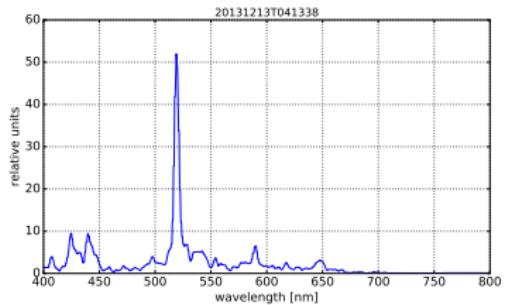
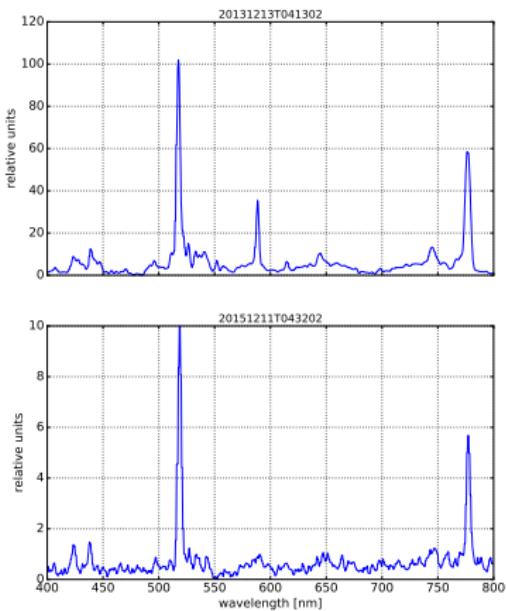
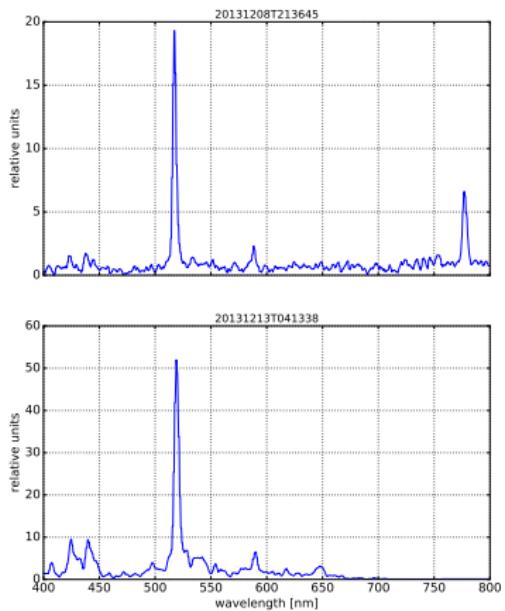


ICC7



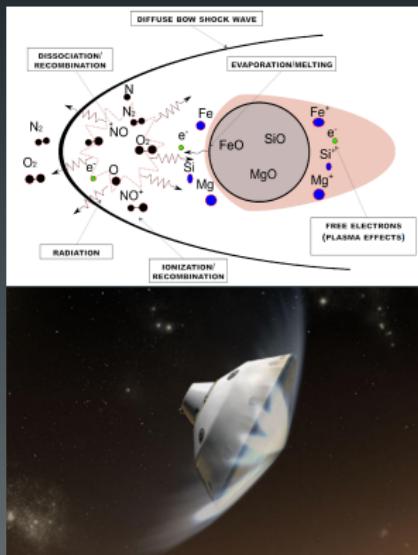
ICC8

METEOR SPECTRA PIPELINE

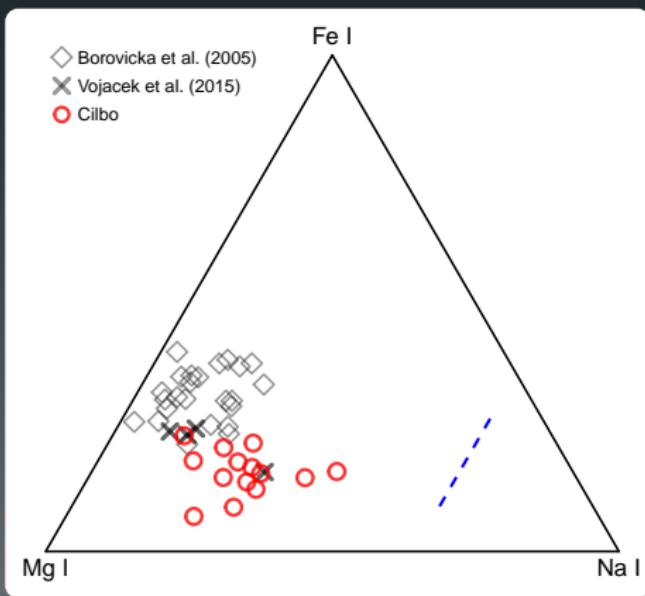


PARADE – PlasmA RAdiation DatabasE

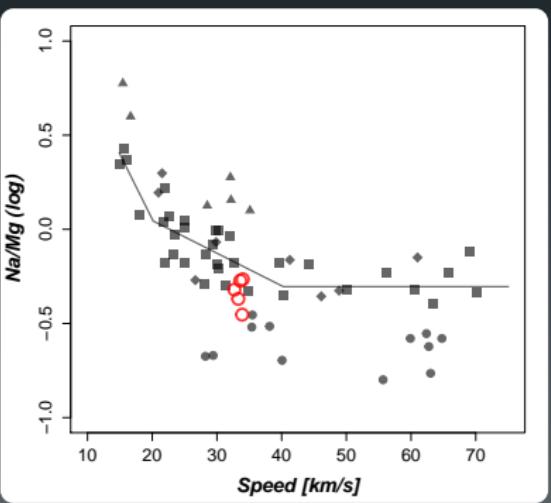
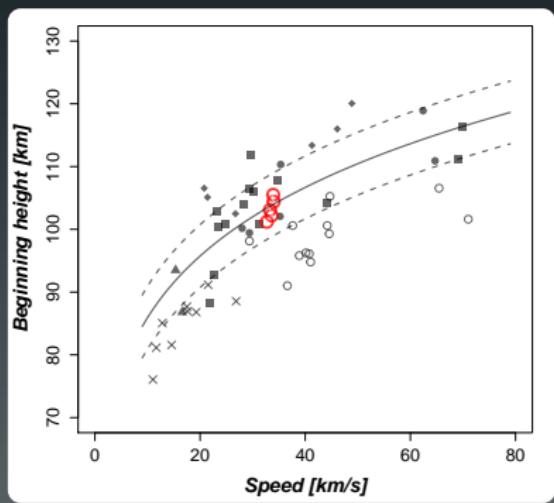
- developed: 1996 (Fluid Gravity Engineering Ltd, Institute Raumfahrt Stuttgart, Aerophysics Consulting)
- models the radiation output of spacecraft entries,
- meteor spectrum modelling,
- full list of species in meteor spectra need to be added.



Spectral classification of meteors



METEOR SPECTRA PIPELINE

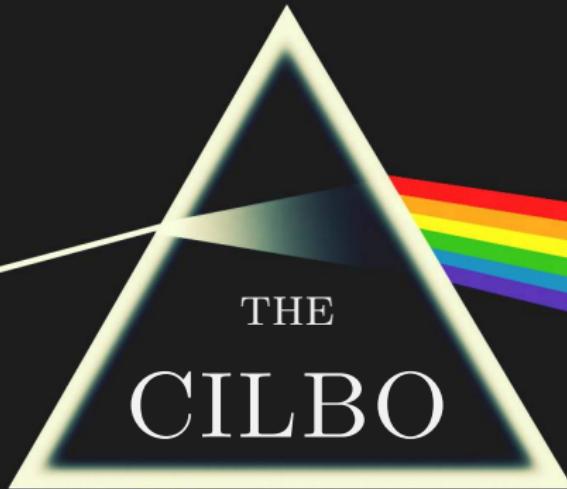


- Link the physical properties: meteoroids – parent body.
- The distribution and evolution of dust in the Solar System.
- Potential asteroid impact hazards.
- Impact risk assessments for numerous ESA missions.
- Studying atmospheres of other planets or satellites.
- The dynamics of dust particles around other stars.
- ...

What we still need?

- Missing elements and molecules in our model
(PARADE's input)

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THANK YOU
FOR YOUR ATTENTION