



M. Jingo

**Wits/Hess Group: S.
Colafrancesco, N. Komin, A.
Chen**

**Fermi Summer
School, 2015
May 25 – June 05
University of Delaware**

The H.E.S.S. Collaboration

Countries involved:

- [Germany](#)
- [France](#)
- [United Kingdom](#)
- [Namibia](#)
- [South Africa](#)
- [Ireland](#)
- [Armenia](#)
- [Poland](#)
- [Australia](#)
- [Austria](#)
- [Sweden](#)
- [Netherlands](#)



Angola

Zambia

Namibia

Zimbabwe

*South Atlantic
Ocean*

★
Windhoek

Botswana

Swaziland

Lesotho

South Africa



Slide from Nukri Komin

Background

H.E.S.S. is a system of Imaging Atmospheric Cherenkov Telescopes that investigates cosmic gamma rays in the energy range from 10s of GeV to 10s of TeV. The name H.E.S.S. stands for **H**igh **E**nergy **S**tereoscopic **S**ystem. The instrument allows scientists to explore gamma-ray sources with intensities at a level of a few thousandths of the flux of the Crab nebula (the brightest steady source of gamma rays in the sky).

- Source: NGC1068 (detected by the Fermi LAT up to 30 GeV (not blazar)).
- It is also a galaxy with the flattest gamma-ray spectrum (see Fig.1). The authors interpret the gamma-ray detection in terms of CR associated to star-formation processes.

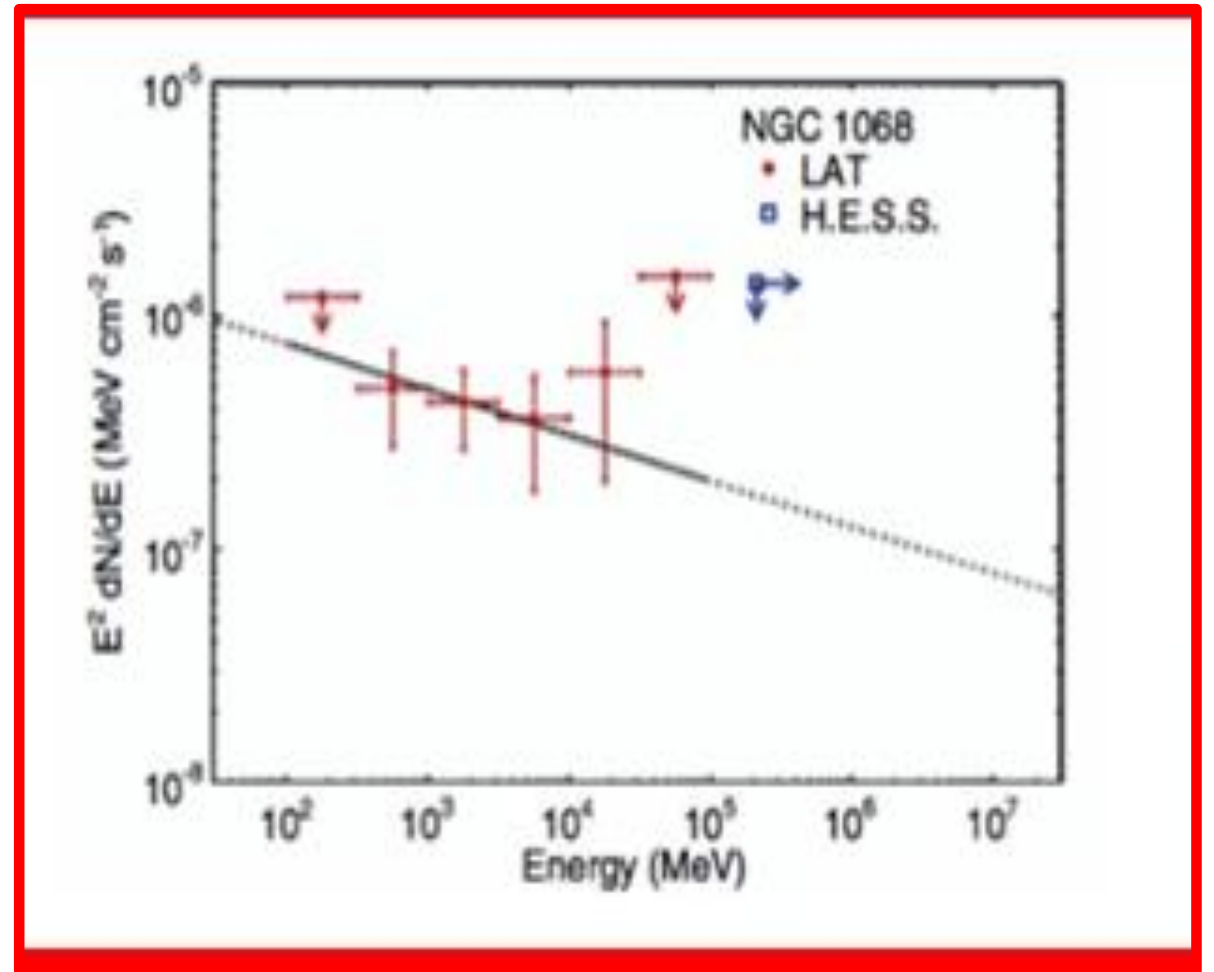


Fig. 1

WITS/HESS APPROACH

- We think another mechanism (CR produced in giant, AGN driven shocks) may be at work. According to Faucher-Giguere the efficiency in accelerating particles by AGN shocked winds may largely exceed that in shells of SNR.
- Therefore, sensitive TeV observations of NGC1068 will:

● Allow us to investigate:

- whether the Fermi LAT spectral slope extends up to TeV energies,
- Possibility of TeV excess being seen
- Detection of a high energy cut-off.

□ Extending the spectrum to TeV:

- ✓ Crucial in estimating the total non thermal high energy luminosity of the source and to compare it with the AGN and galaxy bolometric luminosity.
- ✓ From the total gamma-ray emission it would be possible to estimate the total CR intensity and compare it with the CR density inferred from our mm spectroscopy.

□ Detection of a high energy cut-off:

- ✓ Can provide information on the maximum energy of the accelerated electrons and compare it with that found in SNR.

THANK YOU



Backup slide

- CR associated to star-formation processes, adopting the paradigms that the primary source of Galactic CR are SNR and that the gamma ray emission is due to CR interaction with the galaxy ISM.