

# **Gaia and QSOs**

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# Gaia

ESA launch 2012

- ◆ **Multi-epoch**
- ◆ **Microarcsec astrometry**
- ◆ **Photometry (up to 20 mag)**  
+
- ◆ **Spectroscopy (up to 17 mag)**

continuously scanning spacecraft



**Reconstruct the structure, evolution and formation of the Milky Way**

Initially GAIA, as an acronym for Global Astrometry for Astrophysics

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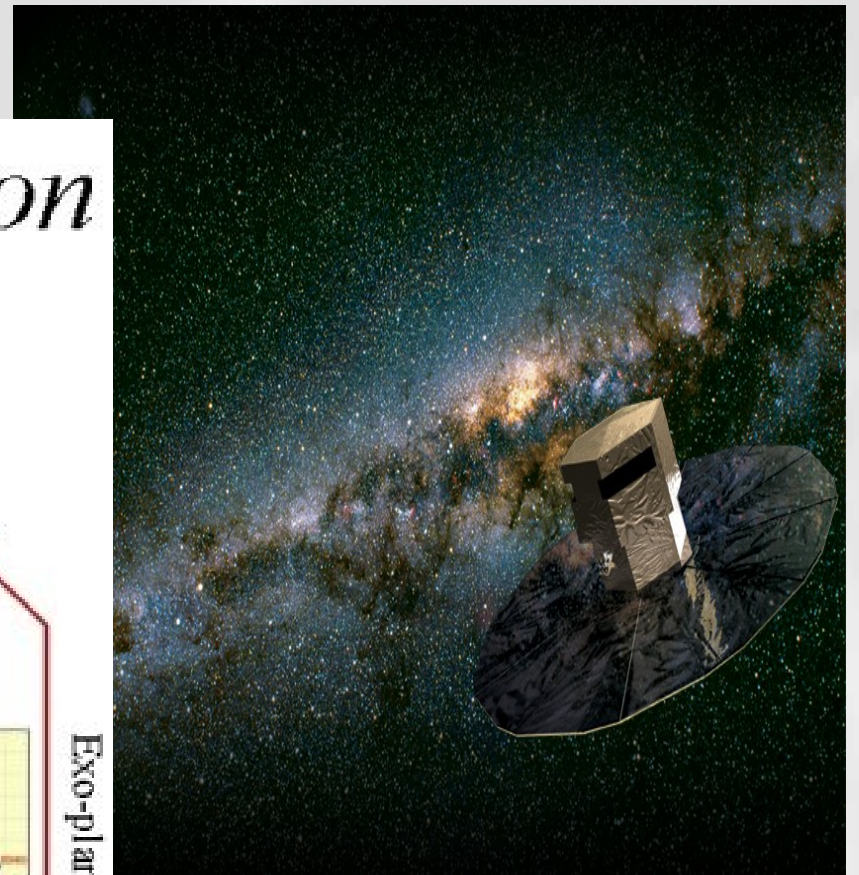
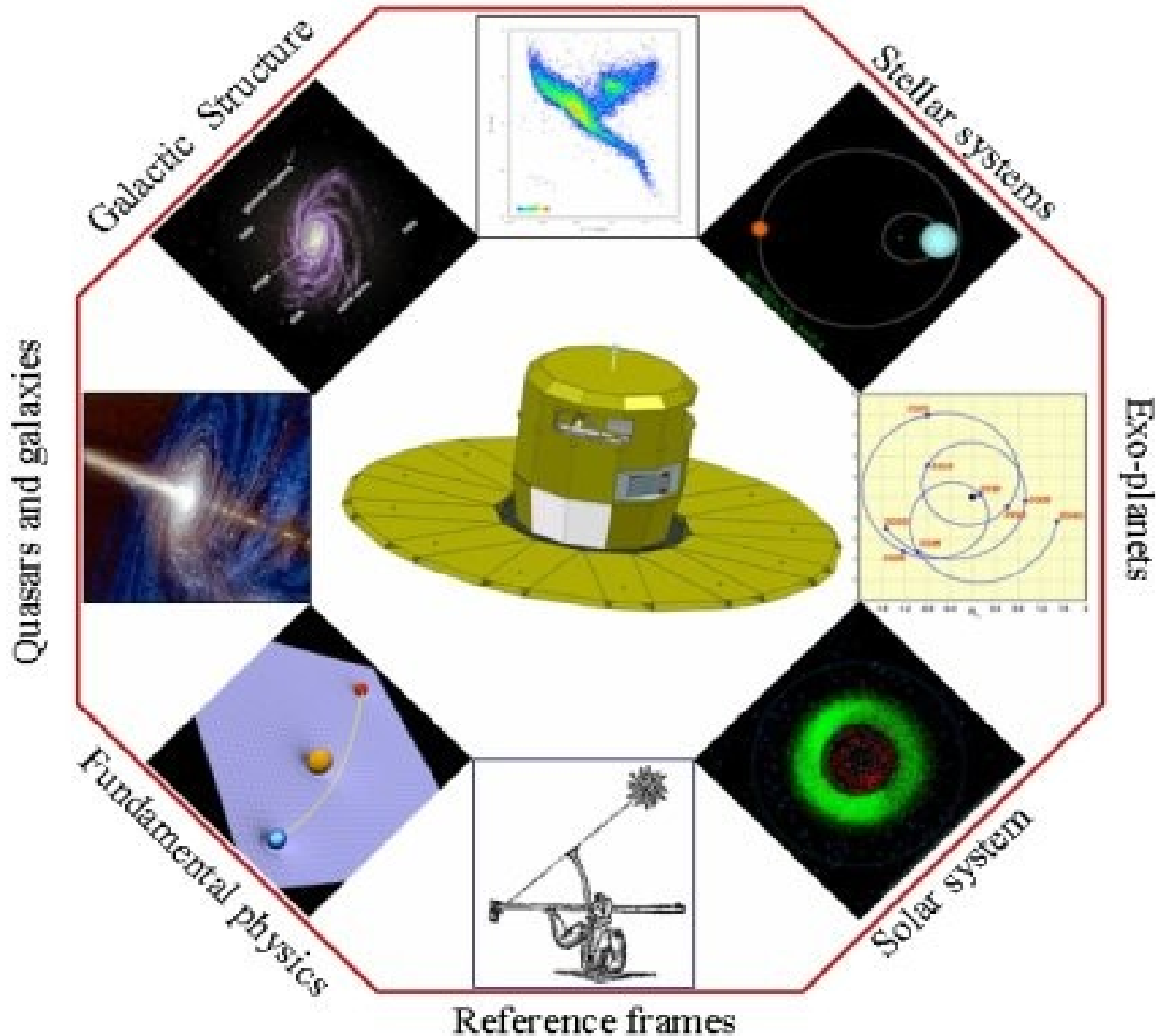
<b>Magnitude limit</b>	<b>20 mag</b>
<b>Completeness</b>	<b>20 mag</b>
<b>Bright limit</b>	<b>6 mag</b>
<b>Number of objects</b>	<b>26 million to <math>V = 15</math></b> <b>250 million to <math>V = 18</math></b> <b>1000 million to <math>V = 20</math></b>
<b>Quasars</b>	<b>500,000</b>
<b>Galaxies</b>	<b>1,000,000</b>
<b>Accuracy</b>	<b>7 <math>\mu\text{as}</math> at <math>V = 10</math></b> <b>10 – 25 <math>\mu\text{as}</math> at <math>V = 15</math></b> <b>300 <math>\mu\text{as}</math> at <math>V = 20</math></b>
<b>Photometry</b>	<b>Low-res. spectra to <math>V = 20</math></b>
<b>Radial velocity</b>	<b>15 km/s to <math>V = 16-17</math></b>

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# Gaia: A versatile mission

Stellar Astrophysics



**Gaia as a New Facility  
AGN point of view**

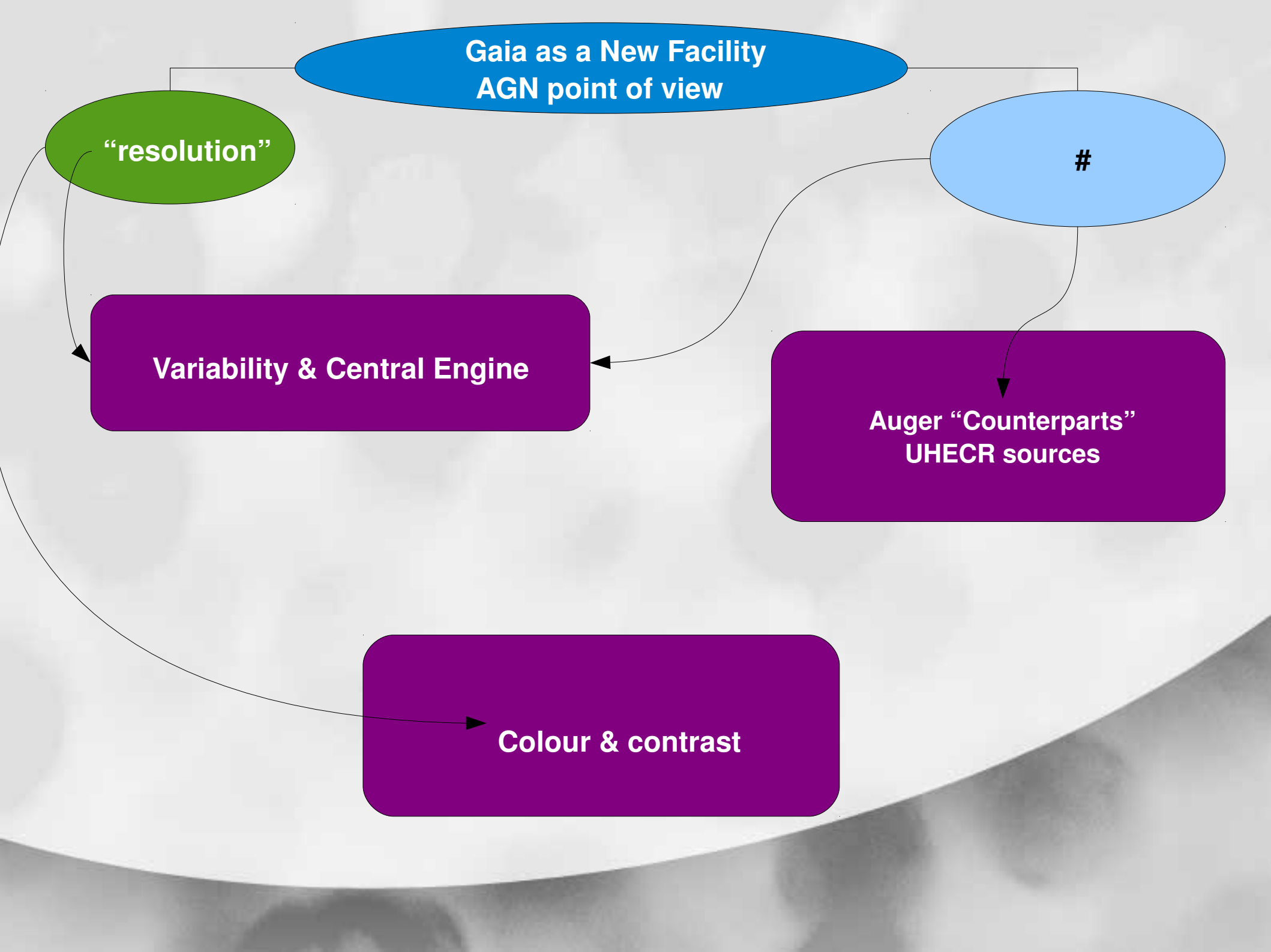
**“resolution”**

**#**

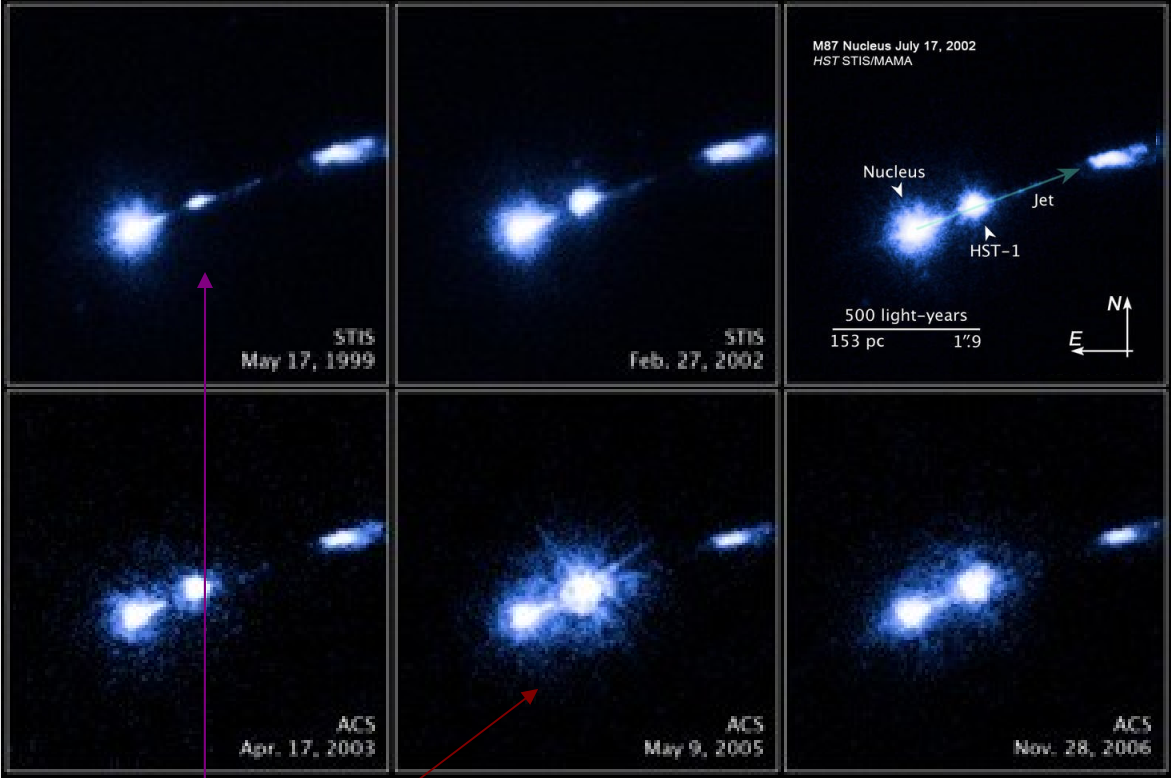
**Variability & Central Engine**

**Auger “Counterparts”  
UHECR sources**

**Colour & contrast**



# Variability & Central Engine



. Image: NASA, ESA, and J. Madrid (McMaster University).

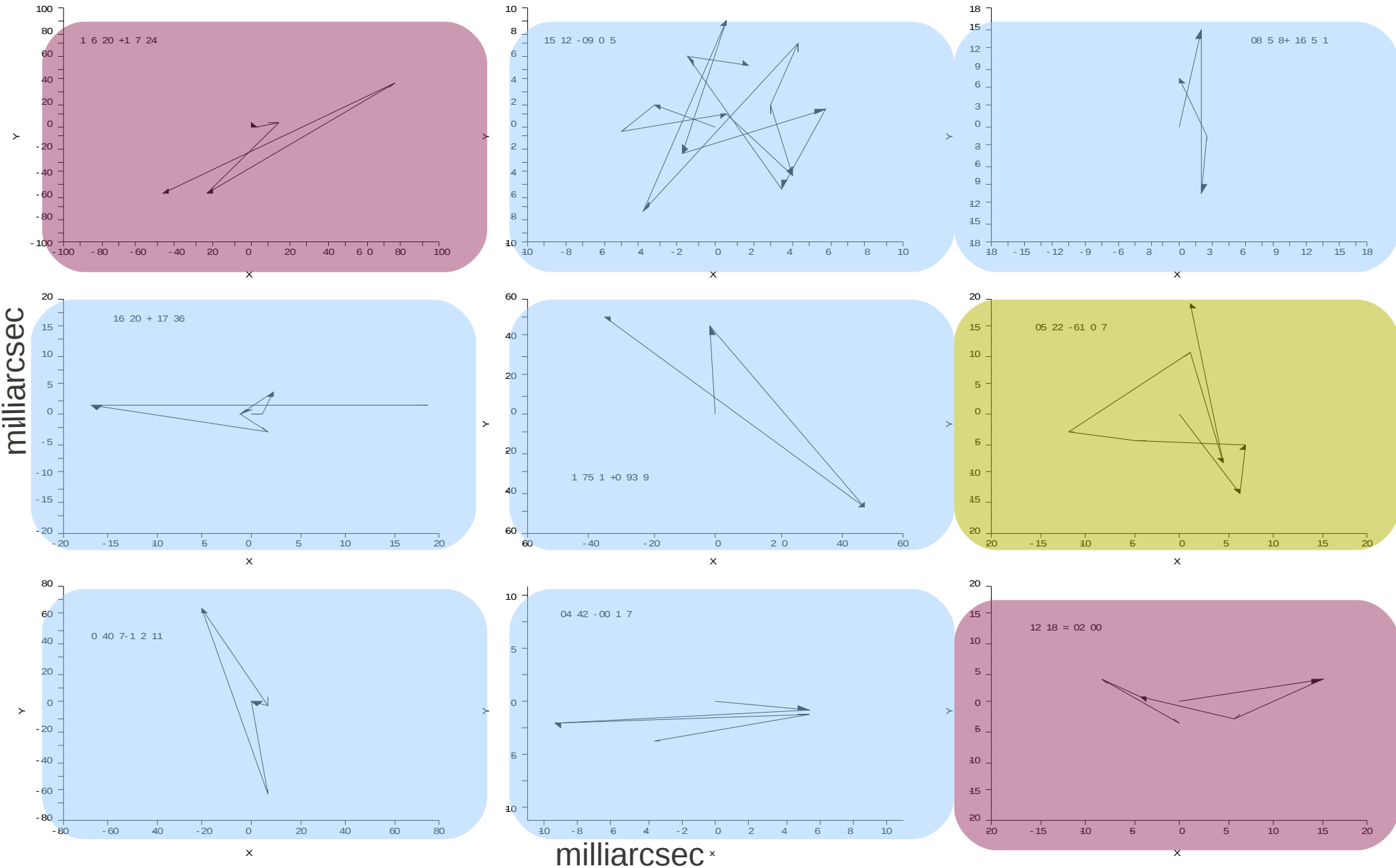
M 87

90x brighter

# Variability : the ESO2p2 program

Andrei et al

- related with new features (e.g. shocks, new blobs of plasma) along the jet ?
- variability @ the central region affecting BLR or/and NLR regions ?

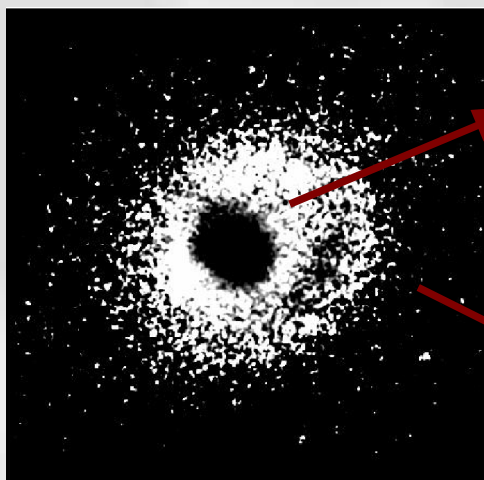


## Colours

### Nordic Optical Telescope

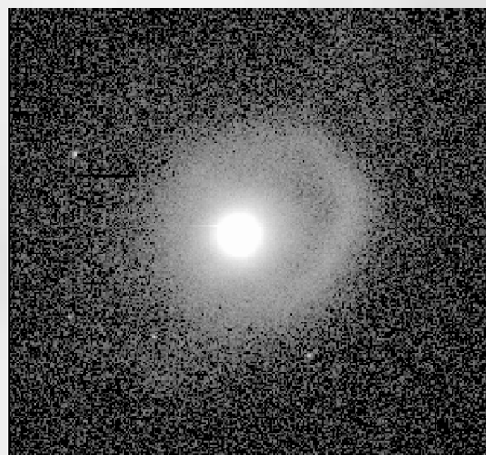
~ 0.7" resolution ; 1" = 1623 pc

Antón, Browne & Marchã, 2008

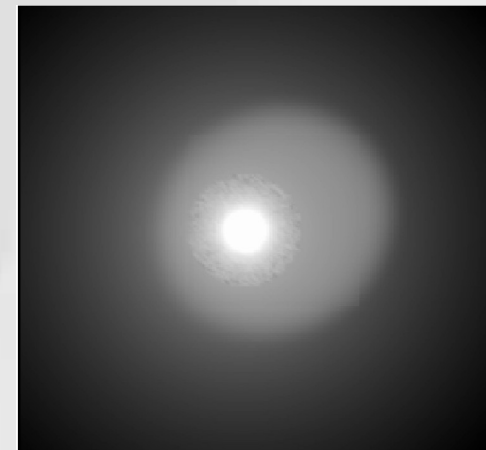


B-R

Core-jet  
and/or  
accretion disk  
+  
Star burst?



R



3-component Sersic model (8,4,0.1)



Gaia as a New Facility

statistics

UltraHigh Energy Cosmic Rays – UHECR

AUGER counterparts

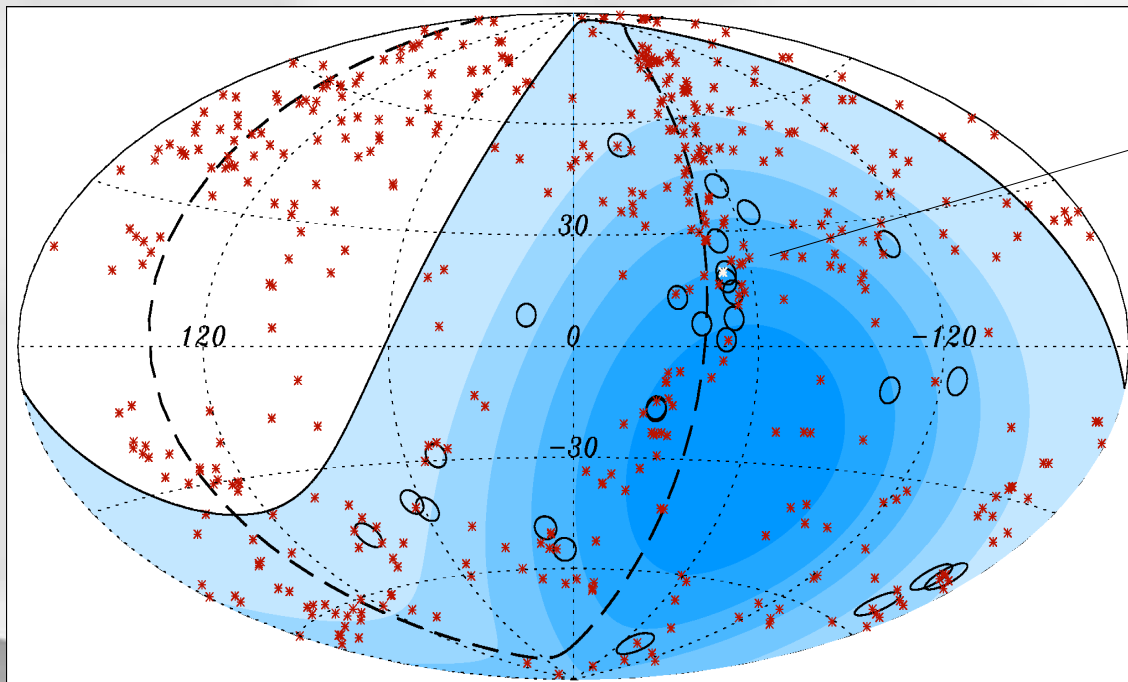
## Cosmic Rays with $E > 10^{20}$ eV

Extremely rare

$z < 0.05$

Origin closer than 200 Mpc, due to GZK  
(Greisen, Zatsepin, and Kuzmin) effect

Mean free path for the Interaction of the particles with CMB  
photons, producing pions



Correlation based on  
Veron & Veron catalogue

2007: 27 events



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# GREAT

Gaia Research for European Astronomy Training

WG  
Gaia Model

WG  
Survey Census

WG  
Chemical Tagging

WG  
Local Group

WG  
Gaia Alerts

WG  
Solar system

WG  
New Stars

WG  
Distance Scales

WG  
OpenCluster  
Young Association

WG  
Stellar Variab

WG  
Binaries &  
Multiple Systems

WG  
Stellar  
Atmospheres

WG  
Massive Stars

WG  
End states of  
Stellar evolution

WG  
ExoPlanets

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Astrometry  
Reference  
Frames

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Gaia  
Extragalactic

WG  
Quasars

Sonia Anton