Pulsars with Cherenkov Telescopes

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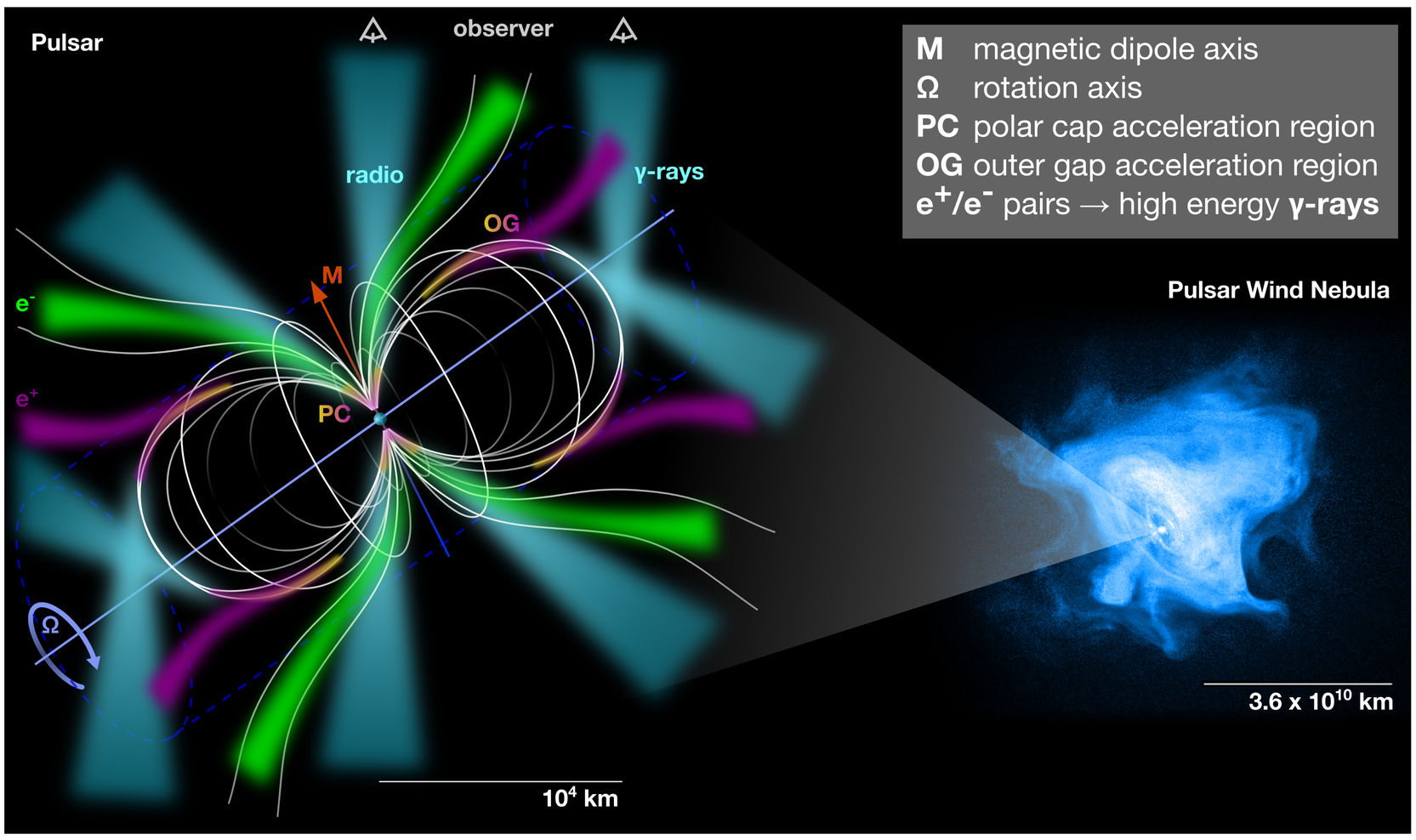
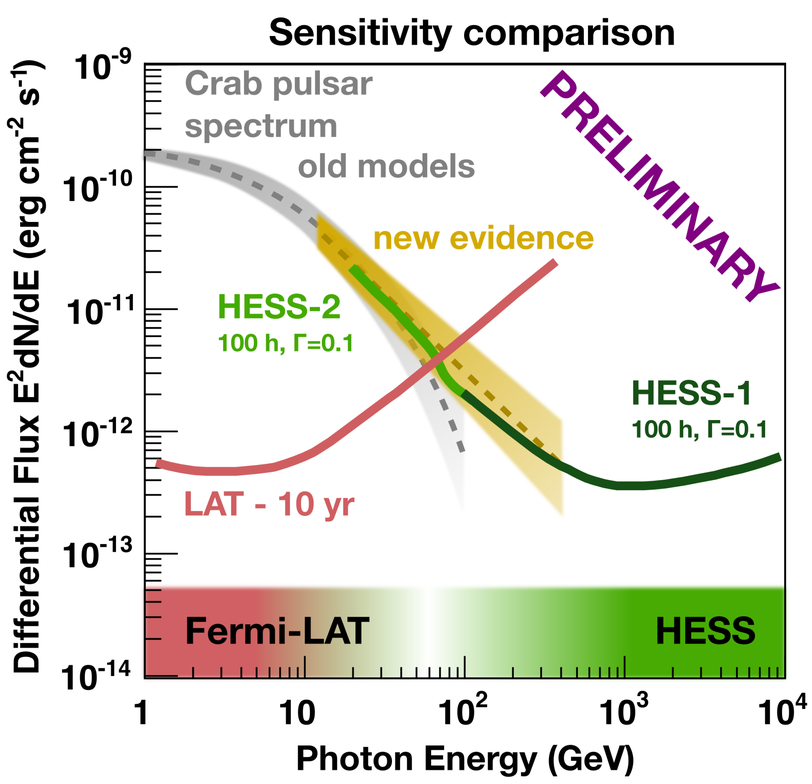
Powerful Cosmic Accelerators

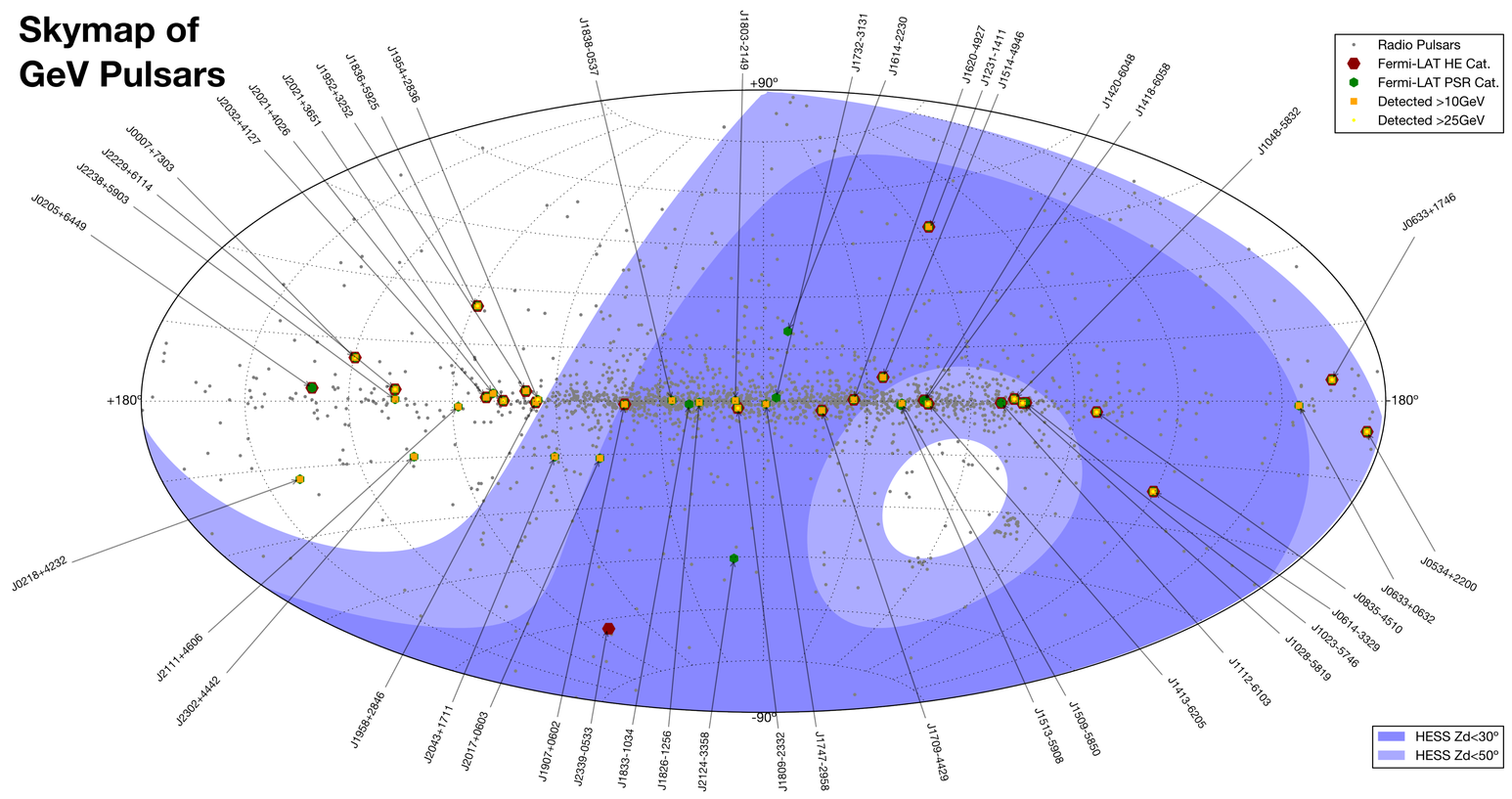
- Pulsars are compact (r ~ 10 km), rotating (P ~ 1ms – 1s), magnetized (G ~ 10^8 T) neutron stars
- TeVatrons for e+/e- pairs
- Bright in HE (>100 MeV) γ-rays
- Physics not fully understood

Pulsed VHE (>100 GeV) γ-rays

- Discovered in 2011, Crab pulsar
- Not expected, new models required
- Search for other examples
- Hints from satellite data
- Threshold region for imaging atmospheric Cherenkov telescopes





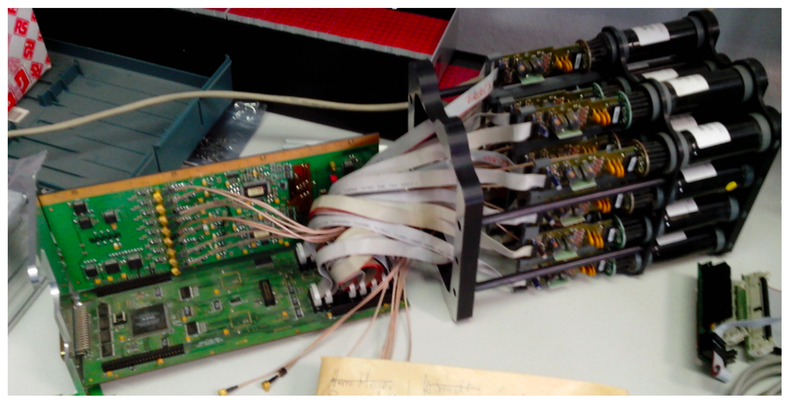


Size Matters

- HESS-2, new 28-m single telescope
- Lowers threshold to ~30 GeV
- Pulsar detection chance before CTA
- Mixed size array: hybrid observation mode lowers background, but...
- Legacy HESS-1 electronics bottleneck: too high readout dead-time

HESS-1 Camera Upgrade

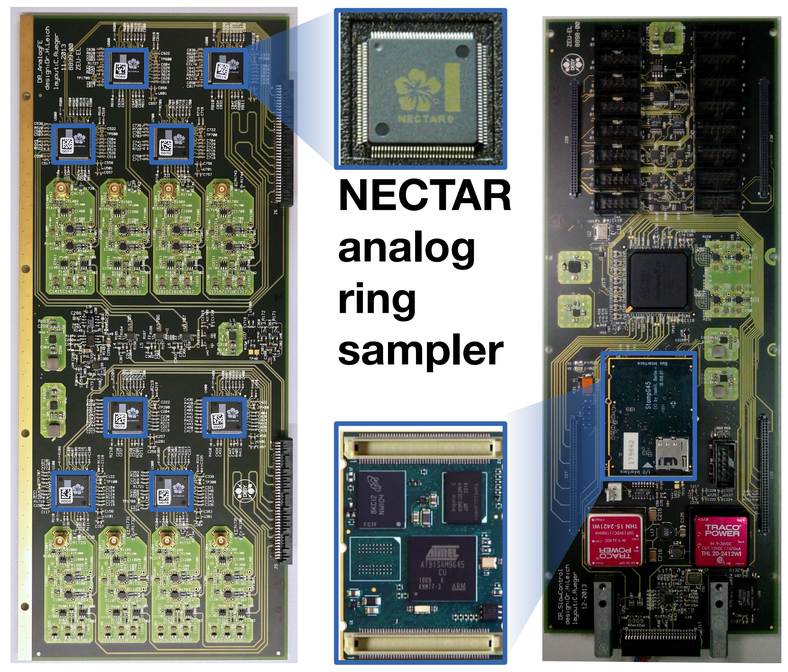
- DESY leads the effort
- New readout board based on NE**CTA**R analog ring sampler
- New control board based on ARM CPU
- Performance for hybrid operation
- Reliability for next >5 years, up to and beyond CTA commissioning



Modular camera unit: PMT drawer

Other upgraded components:

- Power supply
- Trigger interface
- Infrastructure and cooling



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