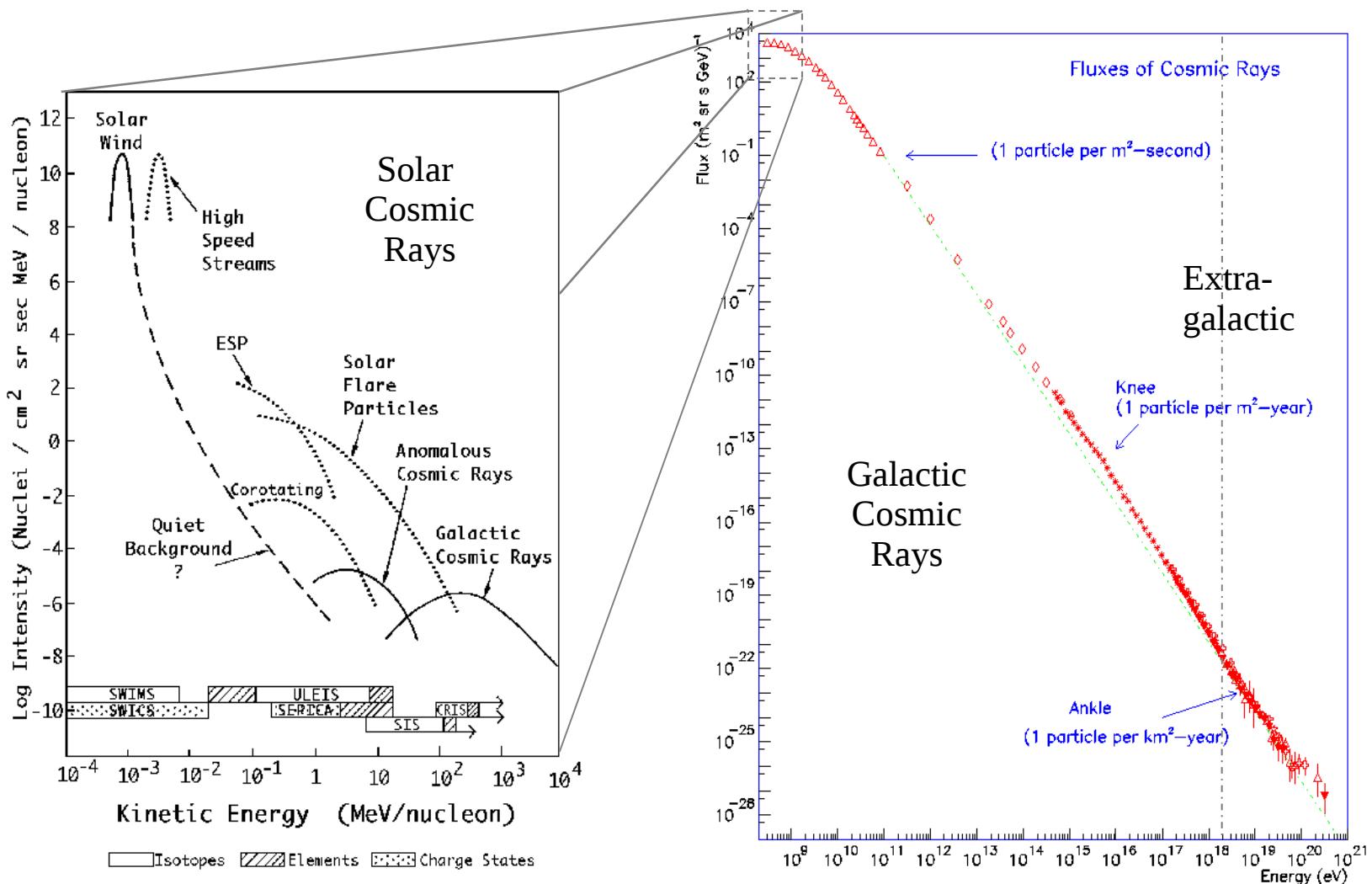


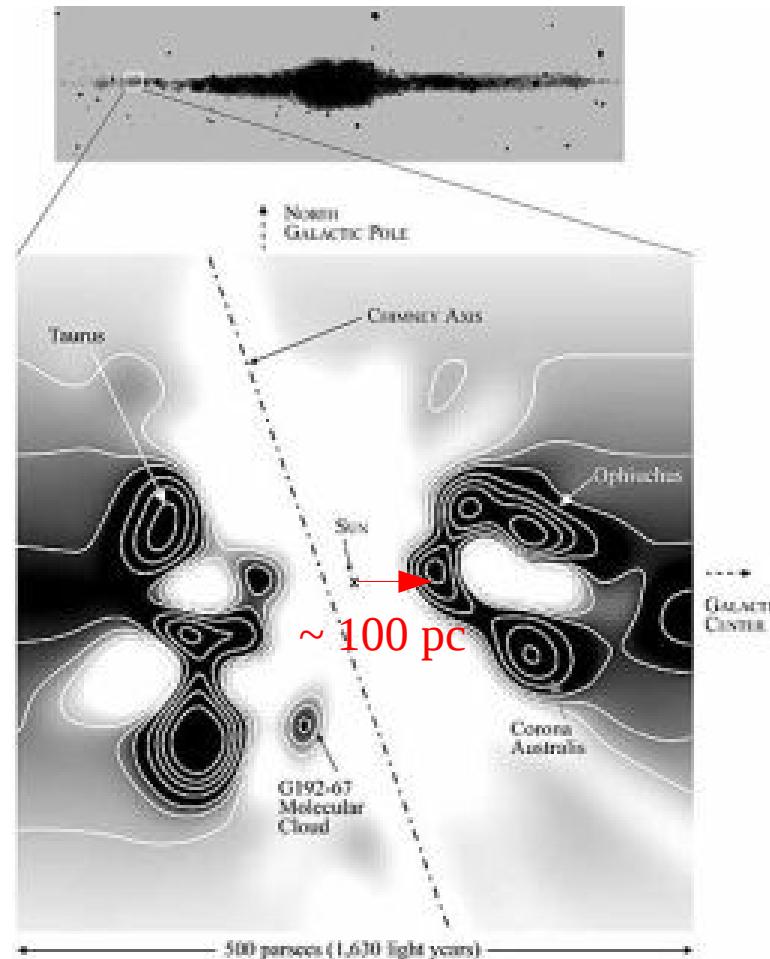
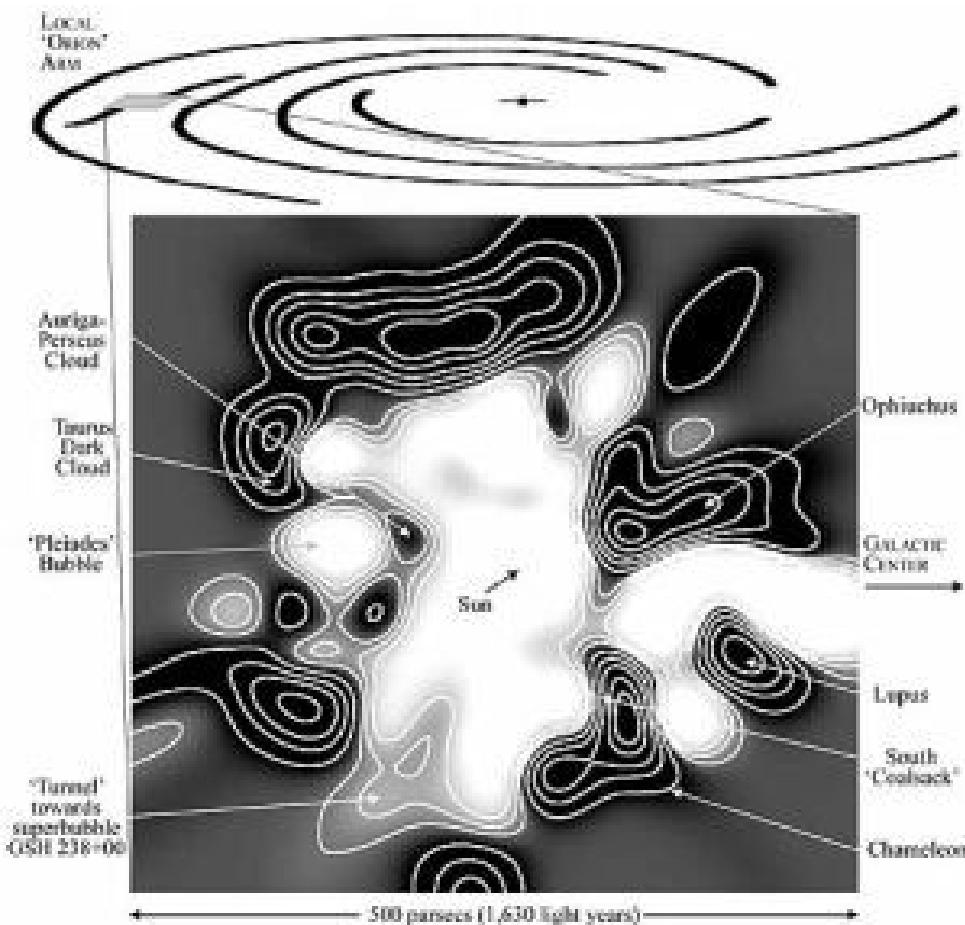
CR spectrum: from Solar to extragalactic origin



=> Solar modulation of GCRs below GeV/amu energies
 => Galactic Cosmic Rays are < PeV/amu energies

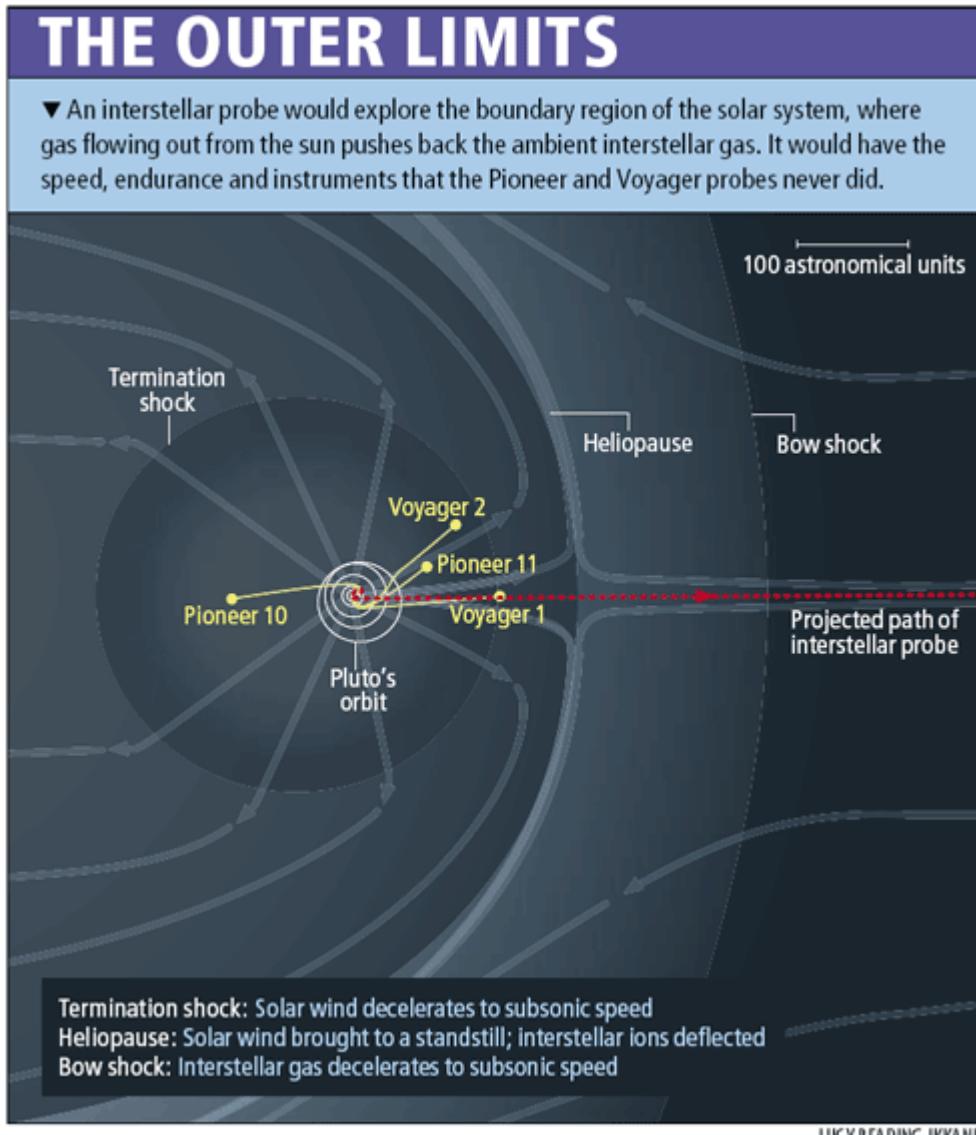
Galaxy, local bubble...

~ 20 kpc



<http://www.solstation.com/x-objects/chimney.htm>

...and Solar cavity



$$100 \text{ AU} = 10^{-3} \text{ pc}$$

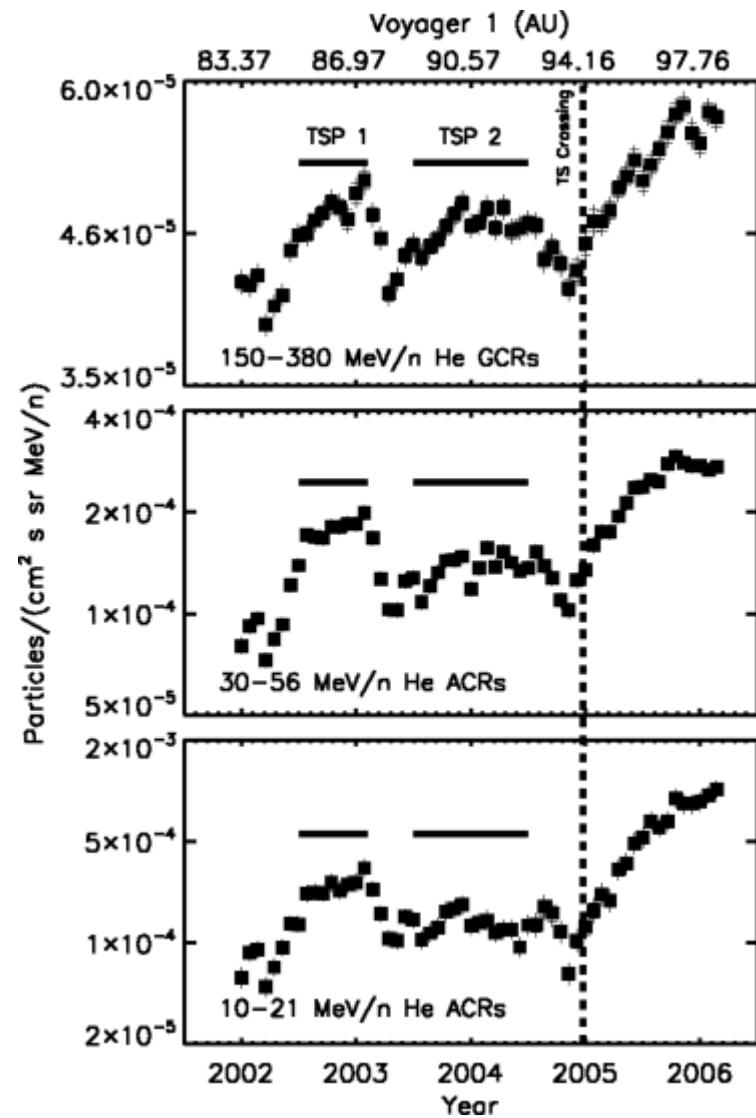
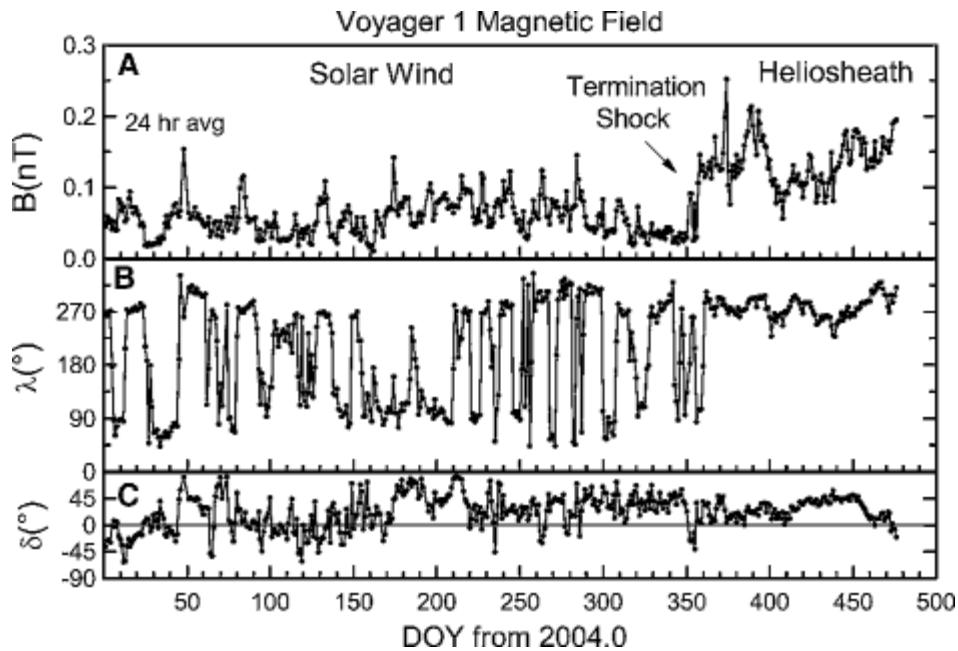
1972 : Pioneer 10

1973 : Pioneer 11

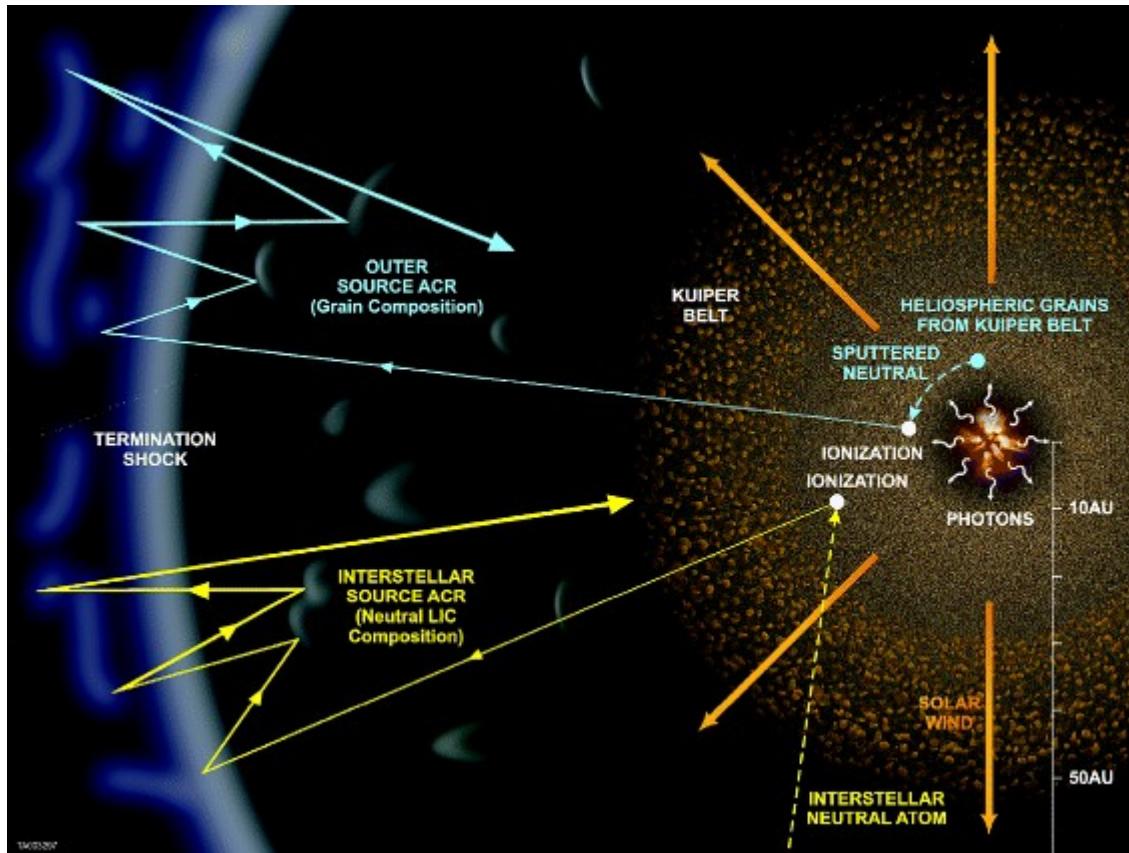
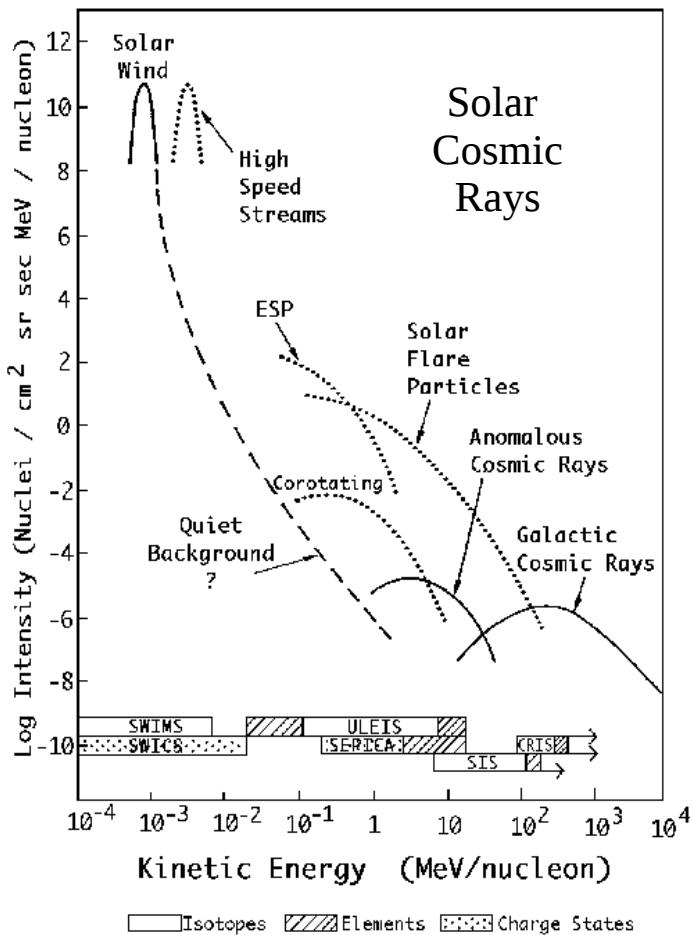
1977 : Voyager 1 & 2

IHP/HEX probe: <http://www.springerlink.com/content/b328u5557w523270/>

Voyager crossed the heliosheath

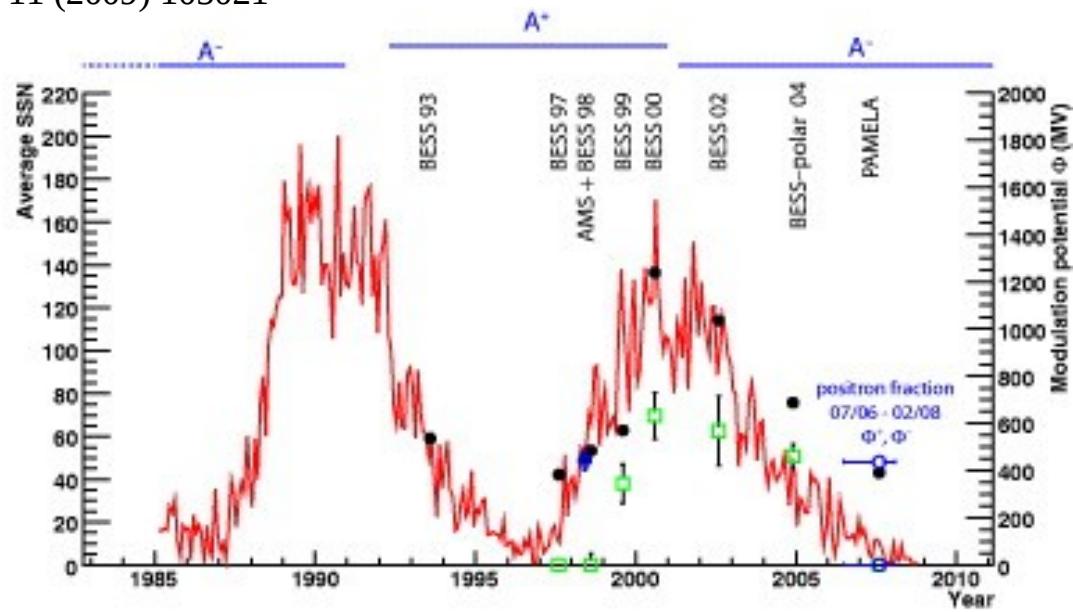
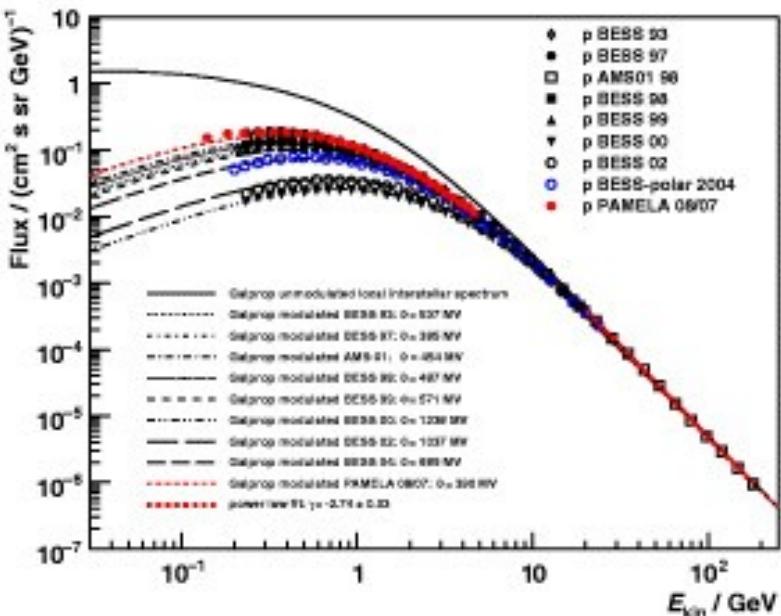


But we do not know all the details yet!



From Top-of-Atmosphere to Interstellar Flux: solar modulation models

Beischer et al., New J.
Phys. 11 (2009) 105021



Questions:

- What is the IS CR spectrum?
- Do we have a good enough Sol. Mod. Model in the AMS-02 area?

On Cosmic-Ray modulation beyond the Heliopause: where is the modulation boundary?

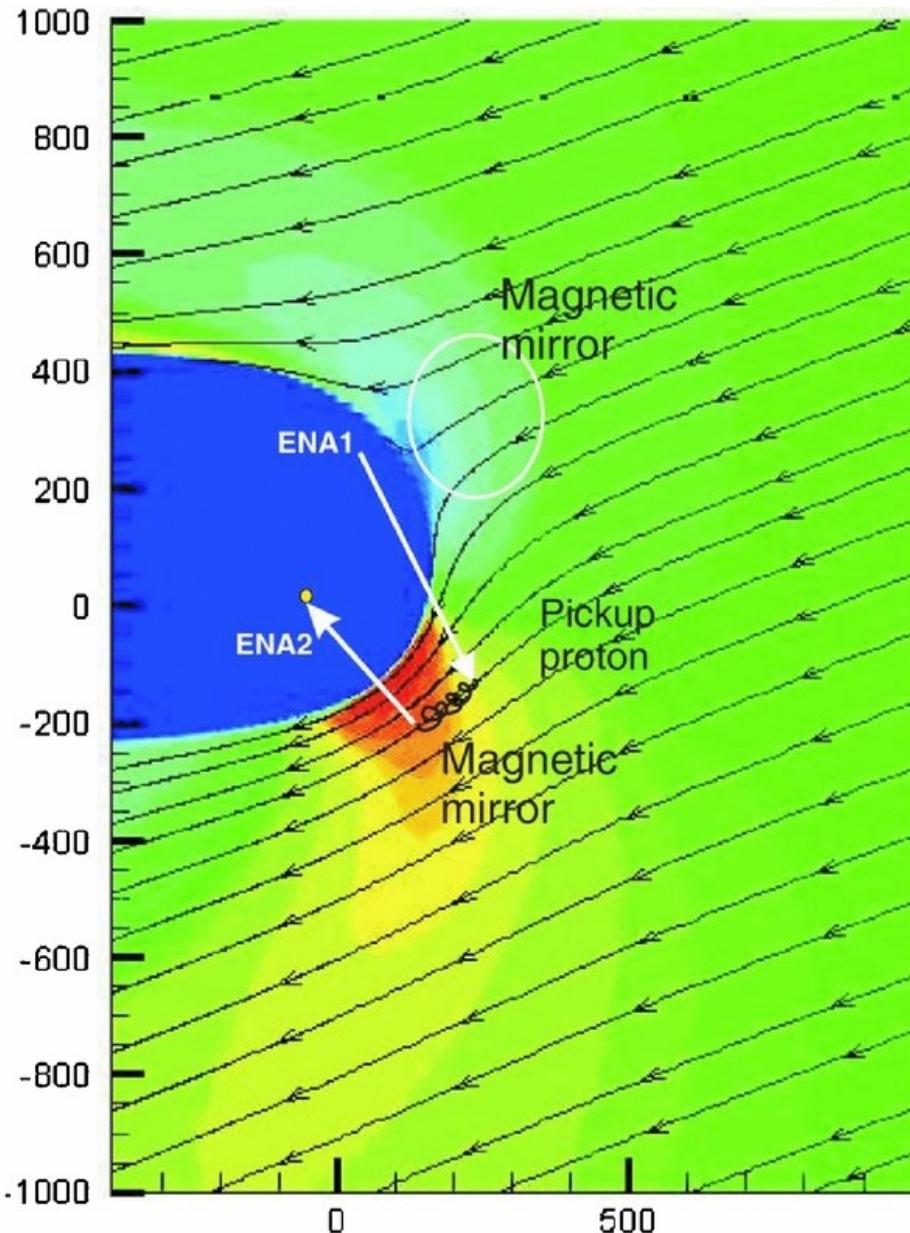
Astrophysical Journal
735 (2011) 128

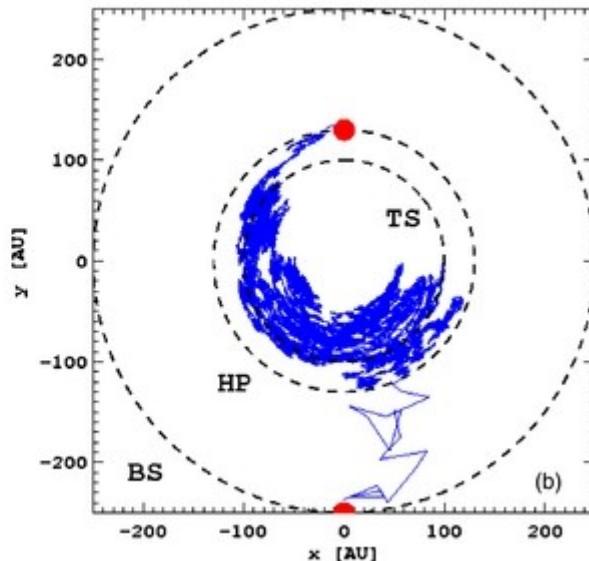
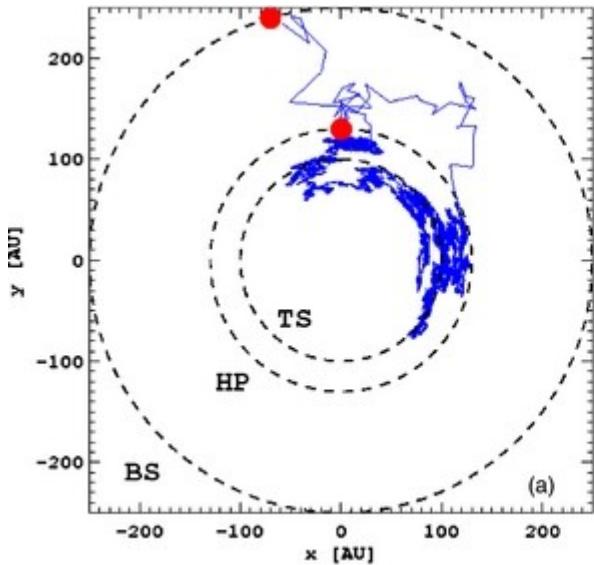
- => claim that “standard” modulation models are not adequate
- => Two-step modulation (Outer heliosheath + “standard”)
- => We do not have access to the IS flux!

(BV) plane, Magnetic Field, μG

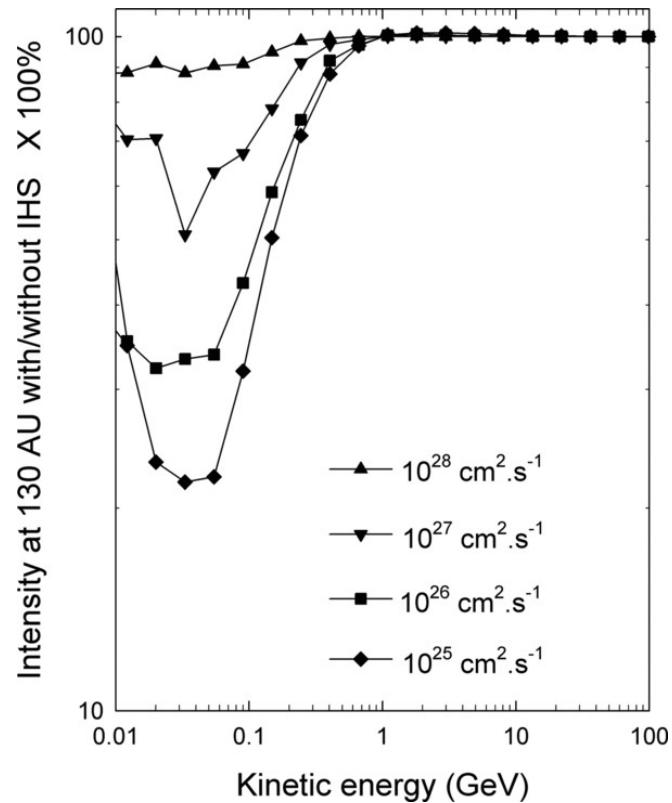


0.5 1.5 2.5 3.5 4.0 4.4 4.5 4.8 4.9 5.2





BS:bow shock @ 250 AU
 HP: Heliopause @ 130 AU
 TS: Termination shock @ 100 AU



THE OUTER LIMITS

▼ An interstellar probe would explore the boundary region of the solar system, where gas flowing out from the sun pushes back the ambient interstellar gas. It would have the speed, endurance and instruments that the Pioneer and Voyager probes never did.

