

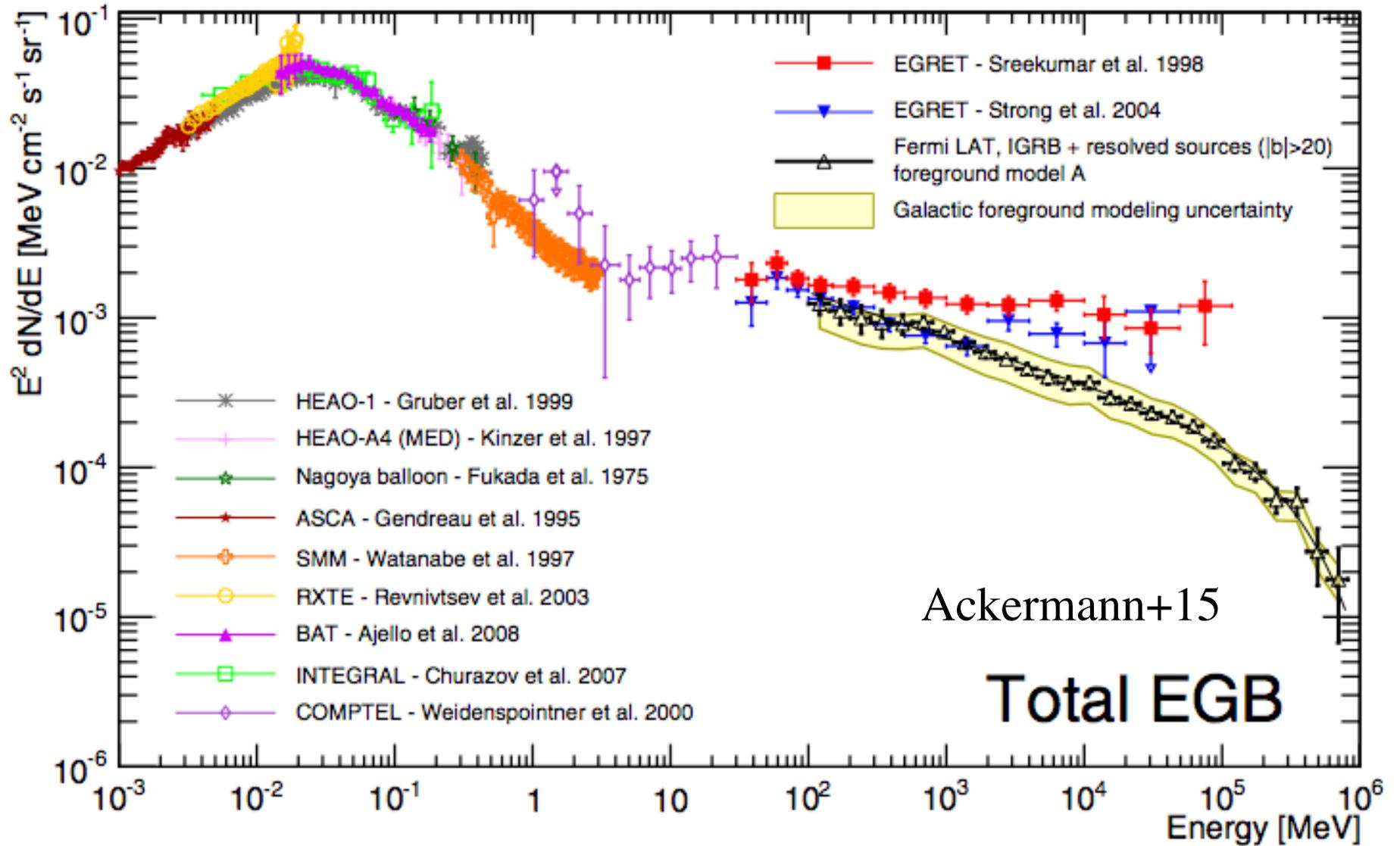


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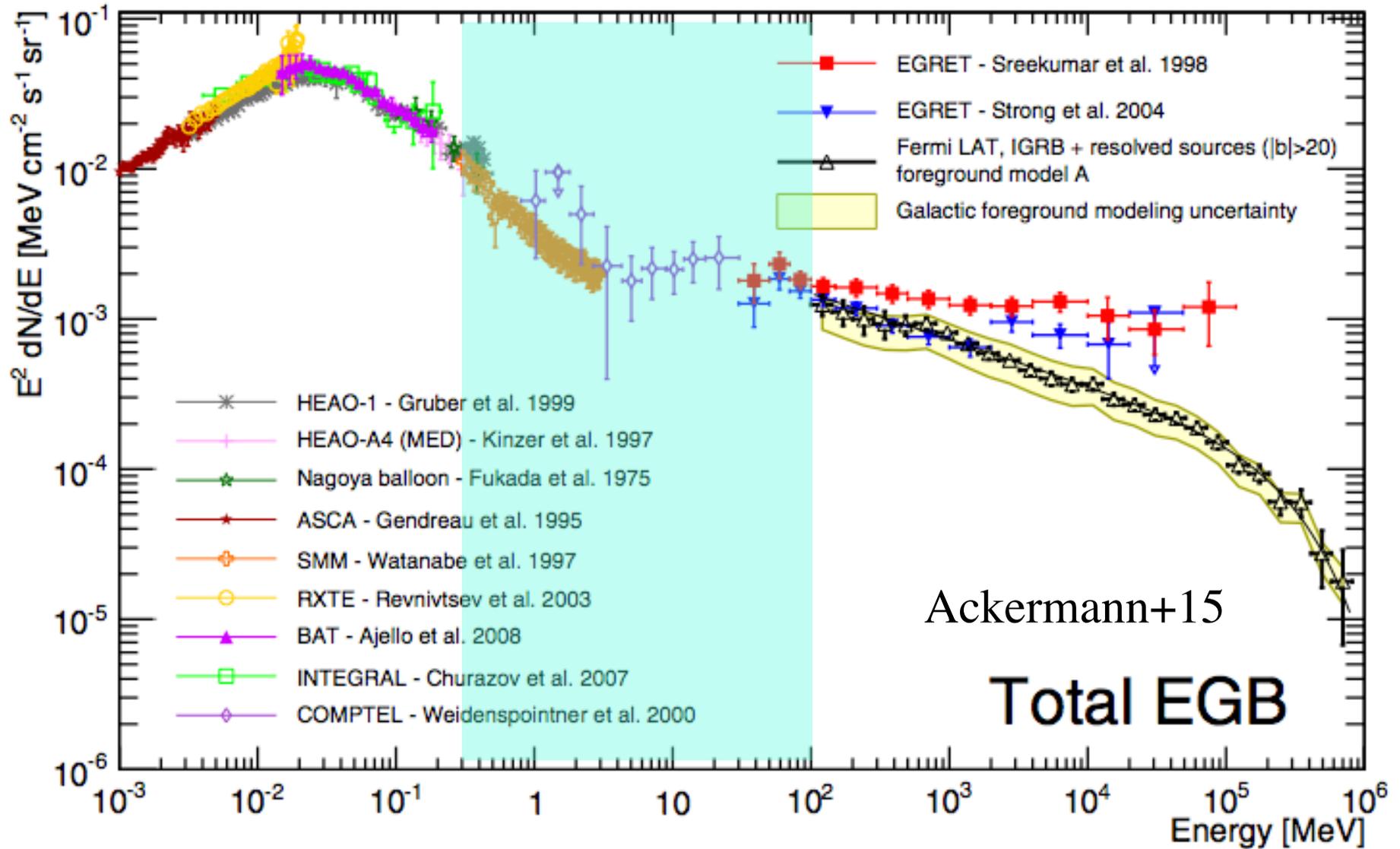
# MeV Background

Marco Ajello & Tonia Venters

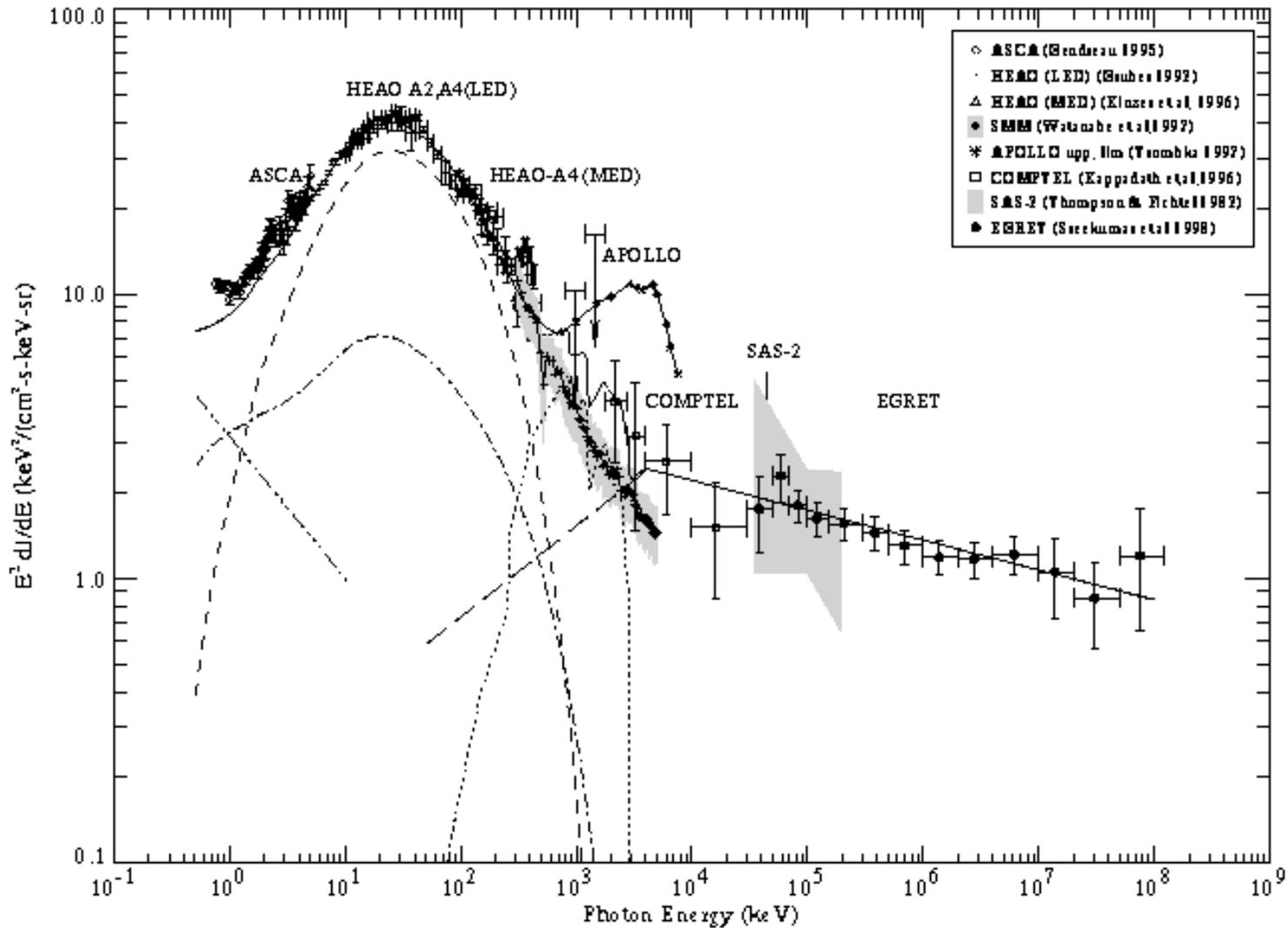
# The MeV Background



# The MeV Background



# Some History

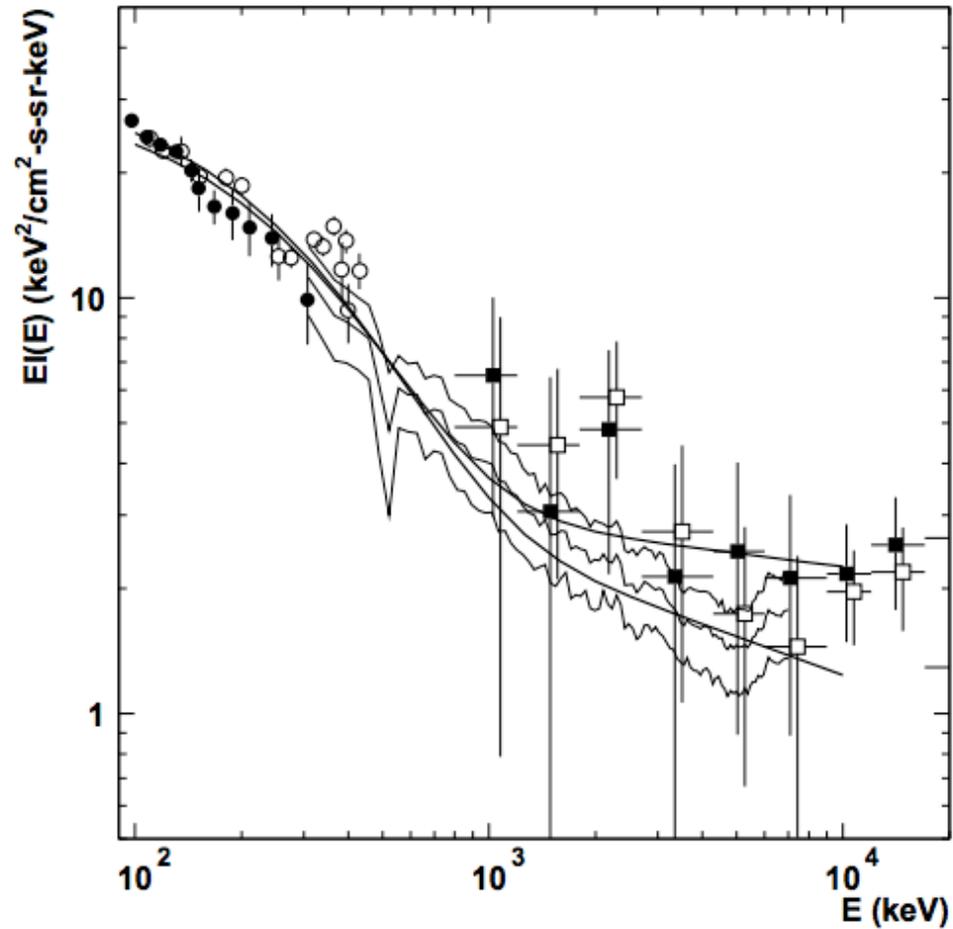


Trombka+, Kappadath+, Weidenspointner+

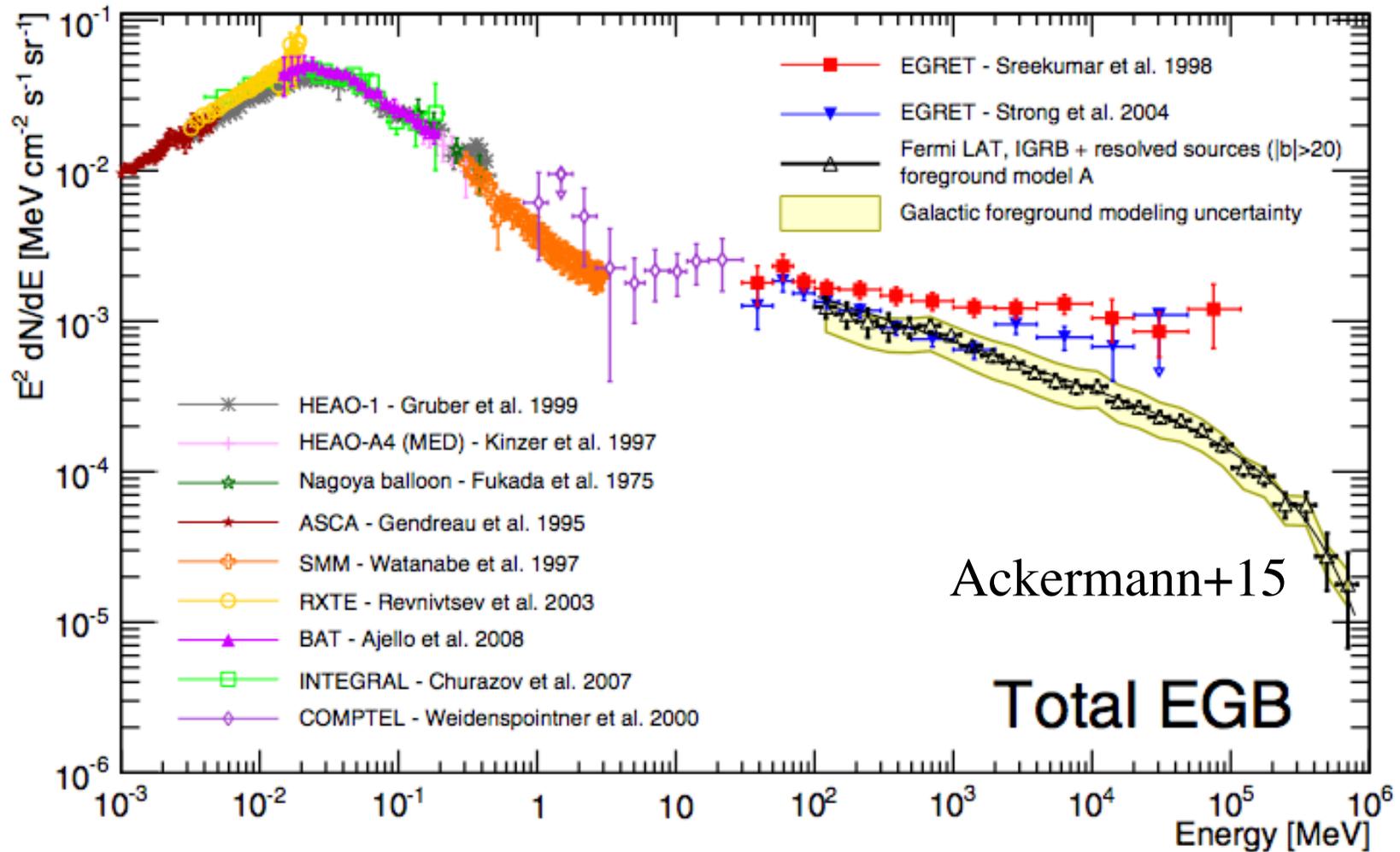
## Latest COMPTEL Measurement

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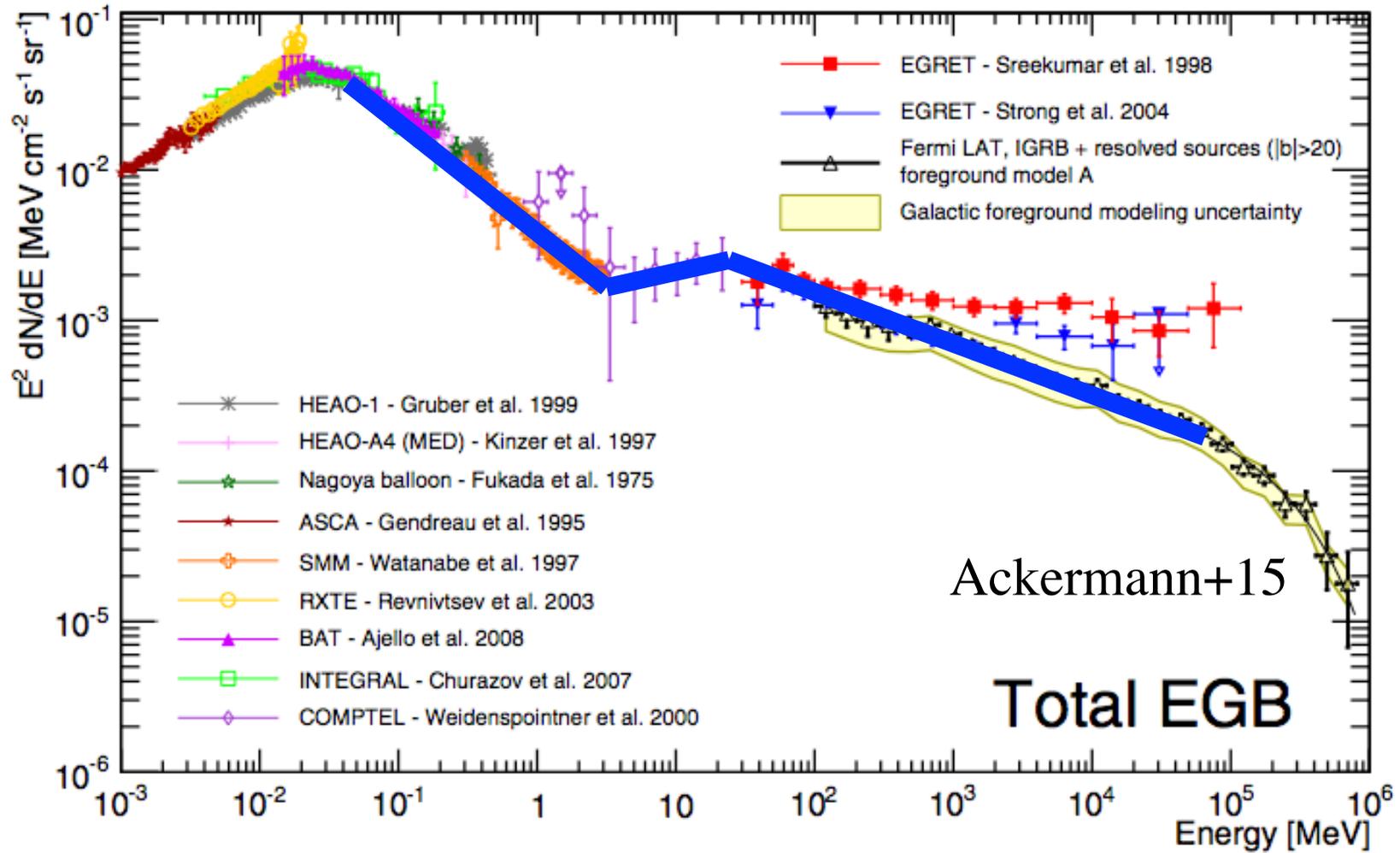
- COMPTEL (Weidenspointer+99) rules out the presence of an MeV Bump



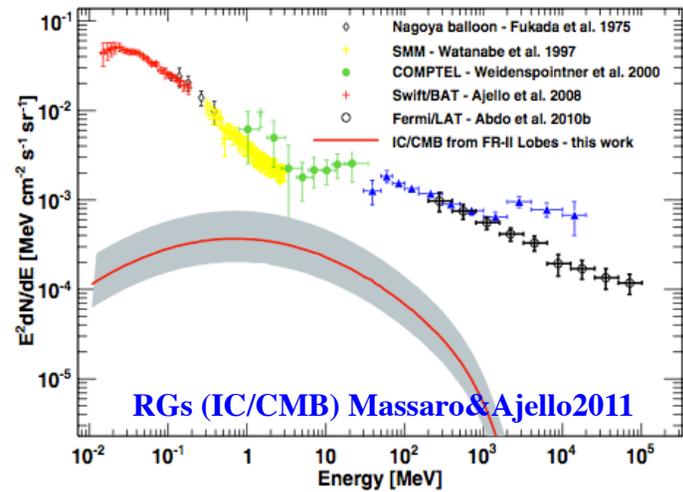
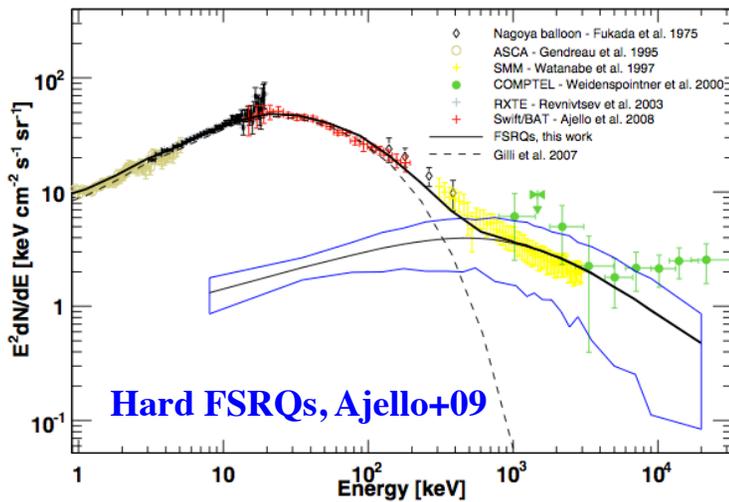
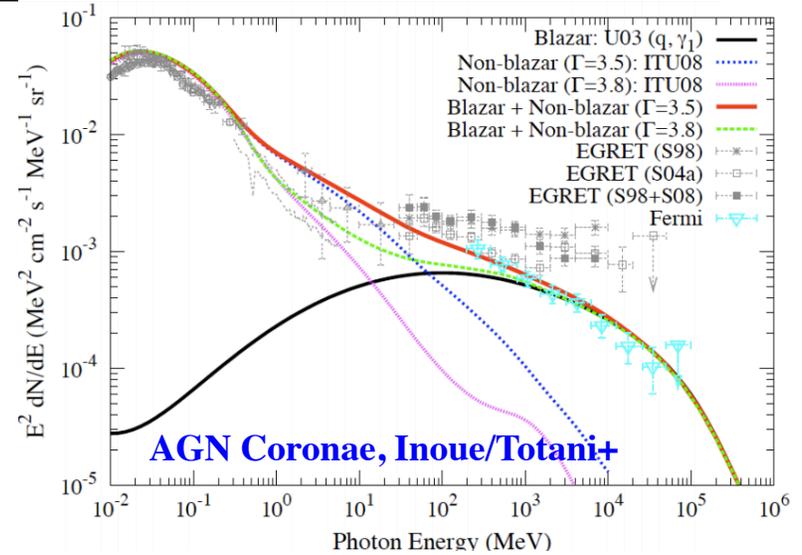
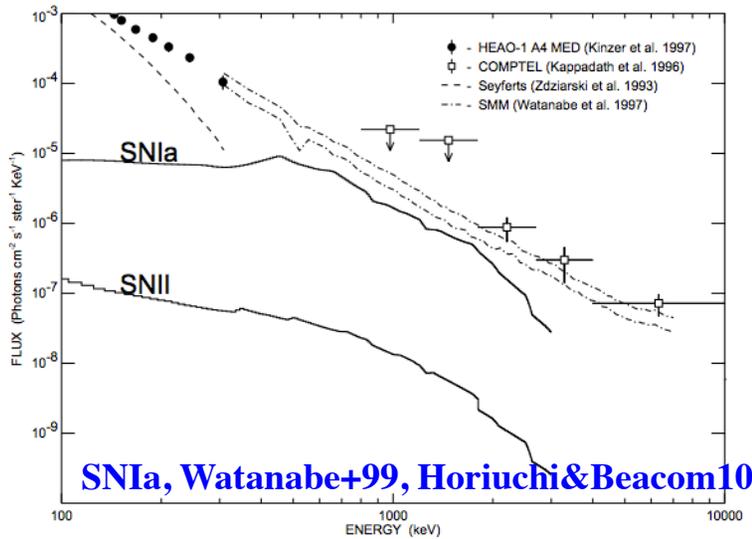
# The MeV Background



# The MeV Background



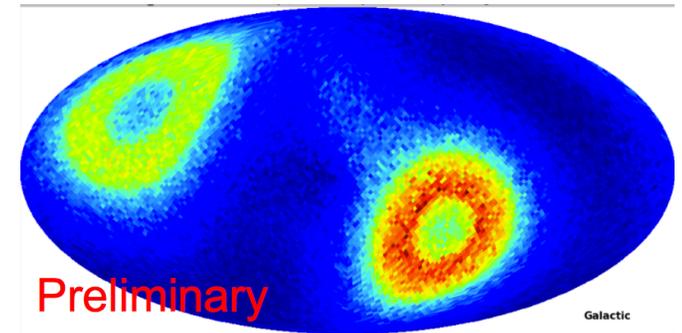
# Hypotheses for the origin of the MeV Background



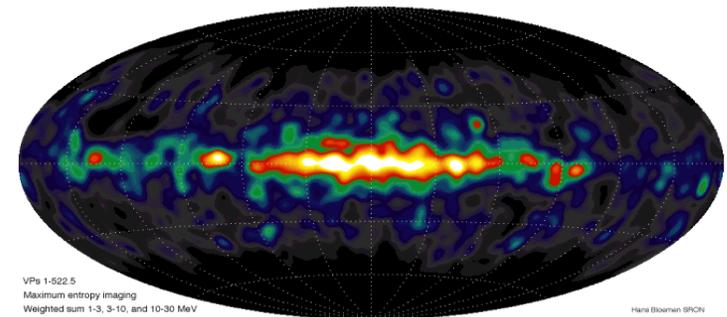
*We will never understand the MeV background unless we go out there and measure it !*

# How to measure the MeV background

- Instrumental requirements:
  - Large field of view ( $\sim$ sr)
  - Total internal background smaller than MeV background (i.e.  $<10^{-5}$  ph/cm<sup>2</sup>/s)
    - Instrumental background /CRs
    - Non-celestial gamma rays generated near the instrument (avoid passive mass near the instrument)
    - Earth albedo photons (maybe the worst ?)
  - Good modeling of the Galactic diffuse emission
  - Good angular resolution
    - It alleviates the Earth Albedo problem
    - It enables source detection

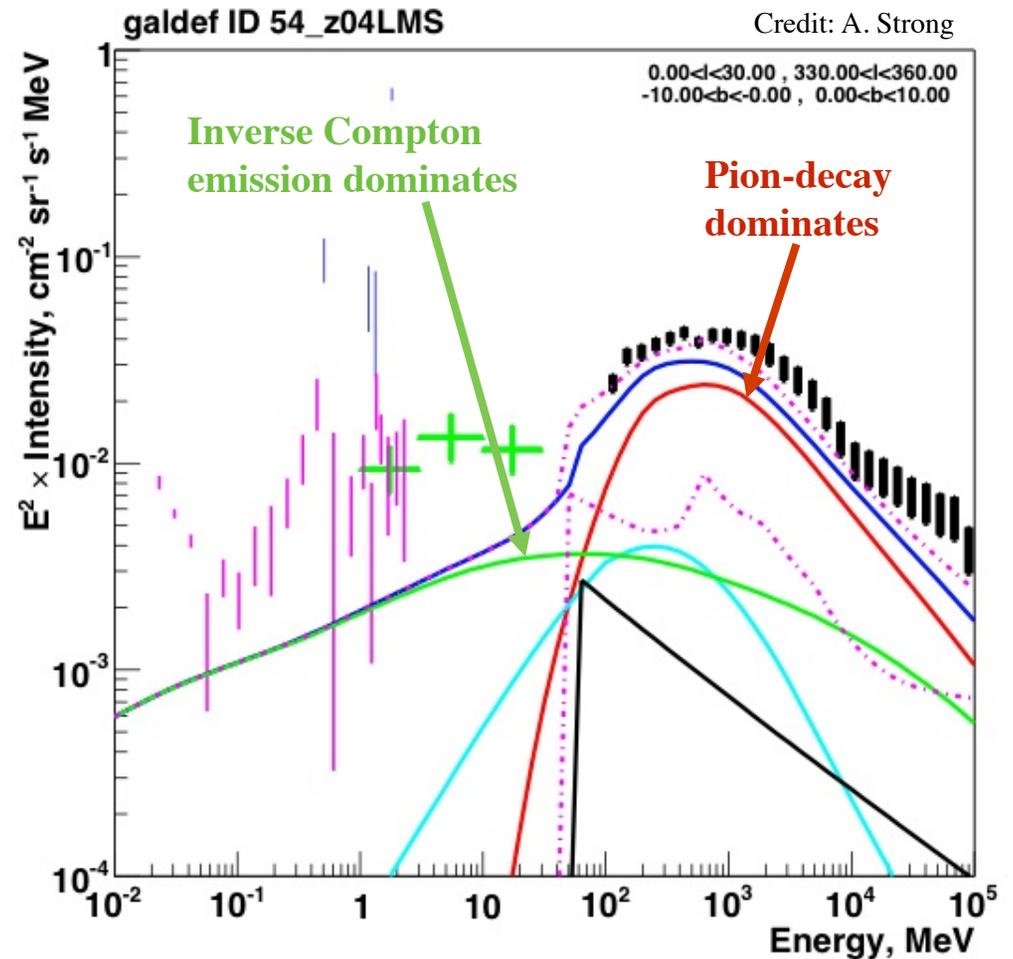


COMPTEL 1-30 MeV



# Galactic Foreground

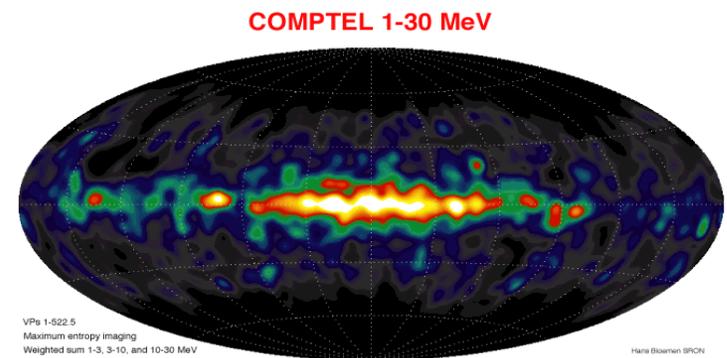
- **Largest uncertainty** of EGB measurement at MeV and GeV arises from the Diffuse Galactic Emission (DGE).
- **DGE foreground** originates from interactions of CR with interstellar gas and radiation fields.
- **Inverse Compton** emission of CR electrons is a critical factor
- **Difficult to model** based on GeV data, since pion-decay processes dominate.
- **Measurements between 1 MeV and 100 MeV** could greatly improve our understanding of the Inverse Compton foreground.



# How to measure the MeV background

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- Instrumental requirements:
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  - Total background smaller than MeV background (i.e.  $<10^{-5}$  ph/cm<sup>2</sup>/s/sr)
    - Instrumental background /CRs
    - Gamma rays generated near the instrument (avoid passive mass near the instrument)
    - Earth albedo photons (maybe the worst ?)
  - Good modeling of the Galactic diffuse emission
  - Good angular resolution
    - It alleviates the Earth Albedo problem
    - It enables source detection
  - Good sensitivity
    - $<10^{-5}$  ph/cm<sup>2</sup>/s





**The End**