The Cosmic Radio Background

Douglas Scott + Tessa Vernstrom & Jasper Wall

Astrophysics from radio to submillimetre Bologna, February 2012

Good United Kingdom

With the compliments of



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<u>Absolute Radiometer for Cosmology, Astrophysics, and Diffuse Emission (PI:Al Kogut)</u>
Cooled system, compares sky with internal reference
6 frequencies, 3–90 GHz (3–100 mm)
Balloon payload, ARCADE 2 flight in 2006
Found excess over CMB + CRB from known sources



ARCADE 2 results

- Excess measured over CMB
- Most significant at 3 GHz
- Could it be genuinely diffuse gas probably not!
- Dark matter signature not!
- What kinds of sources could produce it?
- Let's look at what's known about radio counts
- May as well do if for each frequency band
- → Vernstrom, Scott & Wall (2011)
- (Also ground-based TRES measurements in 2008)



The Cosmic Radio Background (higher frequency bands)



Vernstrom, Scott & Wall arXiv:1102.0814





What kind of sources?



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- Extra sources fainter than ~10μJy
- Could be just below current limits
- But have to break the far-IR/radio correlation



What kind of sources?

- Extra sources fainter than ~10μJy
- Could be just below current limits
- But have to break the far-IR/radio correlation
 - Search for them using stacking of optical/IR sources?
 - Improve the counts using careful P(D) approach
- Pick 3GHz, where ARCADE is most discrepant

New EVLA data at 3 GHz

- Single ~14 arcmin field
- In "Lockman Owen" region (with ultra-deep 1.4GHz)
- C configuration, FWHM ~ 7.5 arcsec
- Expect ~ ΙμJy rms
- Use P(D) fitting
- PI: Jim Condon
- Observations start any day now

