Contribution ID: **52** Type: **Paper**

# An Absolute Flux Density Scale from 1 to 50 GHz

*Tuesday, 17 April 2012 14:00 (30 minutes)*

In order to address deficiencies in the flux density scale used in most radio astronomy observations (Baars et al. 1977), we have carried out observations of the so-called "secondary calibrators" from that paper over the past 28 years with the Very Large Array. To establish an absolute flux density scale from 1 to 50 GHz, we use the emission from Mars at frequencies above 5 GHz, and the Baars scale from 1 to 5 GHz. The model for the emission from Mars (Rudy et al. 1988) has been modified to reconcile it with recent WMAP observations (Weiland et al. 2011).

Fourteen sources have been monitored by this program, including the extragalactic sources 3C48, 3C123, 3C138, 3C147, 3C196, 3C286, and 3C295, the planetary nebulae NGC7027 and NGC6572, the evolved star MWC349, and the planets Venus, Mars, Uranus and Neptune, at ten frequency bands spanning the range from 74 MHz to 50 GHz. Three sources – 3C196, 3C286, and 3C295 are shown to be non-variable over the monitoring period to an accuracy of 1%, and we will present polynomial expressions, accurate to ~1% at most bands, for their spectral flux density from 1 to 50 GHz. The observations of the planets other than Mars have been used to modify existing models for their emission, which can take into account time-variability of viewing geometry. These models are of potential use not only for calibration of high-resolution interferometers like the VLA and ALMA, but also for space observatories like Herschel.

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**Session Classification:** Session 2C

**Track Classification:** Large Surveys and Missions (Sub-mm and Radio)