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STSM host: Thomas Krichbaum (MPIfR, Bonn)

Within the framework of the COST STSM program, I spent two weeks in February 2011 at the Max-Planck-Institute für Radioastronomie (MPIfR) in Bonn, Germany. My host was Thomas Krichbaum; I also had the chance to work in close collaboration with other members of the F-GAMMA program (FERMI-GST AGN Multi-frequency Monitoring Alliance, L. Fuhrmann et al.) and with colleges from India, A. C. Gupta and B. Rani as well.
The STSM made me possible to participate in a large-scale international collaboration. The worldwide multi-frequency variability campaign of the highly variable blazar source, S5 0716+714 involved observations in optical, X-ray, gamma-ray and in several radio-bands. During the campaign a huge flare, a dramatic brightening, was detected in the source, which was observed simultaneously at several wavebands. These observations were aimed to reveal variability characteristics (frequency dependence, correlations across, and time-lags between the wavebands) on monthly timescales.
In the middle of this multi-wavelength monitoring campaign, a slightly different observation of the source was conducted with the Effelsberg radio-telescope. For four days, densely time-sampled observations took place at three frequencies with the aim to reveal any short time-scale variability. Indeed, S5 0716+714 showed variability on less than a day long time-scale, but additionally, we found evidence of an even faster variations (on time-scale of minutes).
Fast, few day long variability in blazars often explained as a result of scattering of the radio waves in the ionized interstellar material of the Milky Way. According to the theory of interstellar scintillation, the more compact the source is at the given frequency, the faster and more pronounced the variation is. Interestingly, the four day-long Effelsberg observation coincided with the peak of the flare event in the source. During similar outbursts in blazars, one highly compact component dominates the flux density. Thus, the source-intrinsic flare may be the reason for the enhanced scattering observed in S5 0716+714.

Even this relatively short visit was extremely useful. I was able to focus entirely on the topic of the STSM, without any distraction. Meeting personally and having face-to-face discussions with colleges from different institutes helped to really strengthen existing and forming new collaborations.