

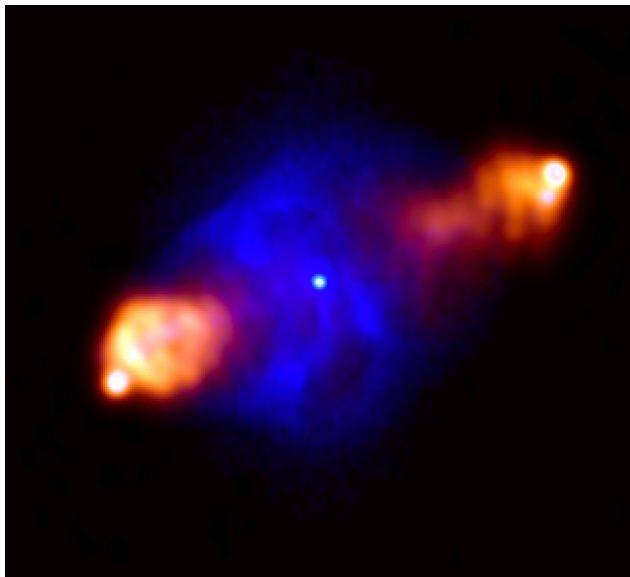


Physikalisches Kolloquium
05.12.2011, 17 Uhr c.t. **Hörsaal E**

The Evolution of Black Hole Feedback at High Redshift with LOFAR

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In recent years, the combination of high resolution X-ray data and radio data has been crucial in recognizing the impact of the activity of black holes in active galactic nuclei on the gas between galaxies in the cores of galaxy clusters. Taken together these data allow estimates for the total energy input into the cluster as well as provide constraints on the particle content of the jets, the duty cycle for outburst activity, and the growth of the central black hole itself.

The talk will show that after calibrating this relationship at lower redshifts in systems with good quality X-ray and

radio data, we can use future low frequency radio surveys to constrain the amount of energy input into the gas by black holes as a function of redshift. We discuss how current X-ray and low frequency radio can be used to study the energetics of feedback in clusters and map the sites where this energy is being deposited. In particular we discuss how new, low-frequency radio data from LOFAR, a new array of radio telescopes built in the Netherlands, can be used to identify and study cluster-scale outbursts in these systems out to higher redshifts.

With such new samples from LOFAR, and ultimately the planned Square Kilometre Array, we can assess the impact of AGN feedback on the large-scale properties of clusters as well as estimate the growth of black holes and their impact on galaxy formation over cosmic time.