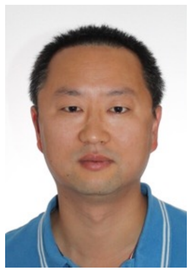
Jets in the nearby changing-look Seyfert galaxies Mrk 590 and NGC 2617



Dr. Jun YANG
Chalmers University of Technology, Onsala Space Observatory, Sweden

Abstract

Dramatic Seyfert type changes might result from intermittent accretion activity. To search for possible ejection activity in the two nearby Changing-look Seyfert galaxies Mrk 590 and NGC 2617, we performed Very Long Baseline Interferometry Observations (VLBI) with the European VLBI Network (EVN). We find that there exist pc-scale faint jets in their radio nuclei. These jets also have partially synchrotron self-absorbed radio cores, indicating the existence for the significant accretion and ejection activity.

Mrk 590 is a nearby galaxy at z = 0.0264. It suffered a cycle of Seyfert type changes between 2006 and 2017. Over the last 50 yr, Mrk 590 also underwent a powerful continuum outburst and a slow fading from X-rays to radio wavelengths with a peak bolometric luminosity reaching about 10 per cent of the Eddington luminosity.

The EVN observations reveal a faint (~1.7 mJy) radio jet extending up to ~2.8 mas (projected scale ~1.4 pc) toward north, and probably resulting from the very intensive AGN activity. To date, such a parsec-scale jet is rarely seen in the known changing-look AGN. The finding of the faint jet provides further strong support for variable accretion as the origin of the type changes in Mrk 590.

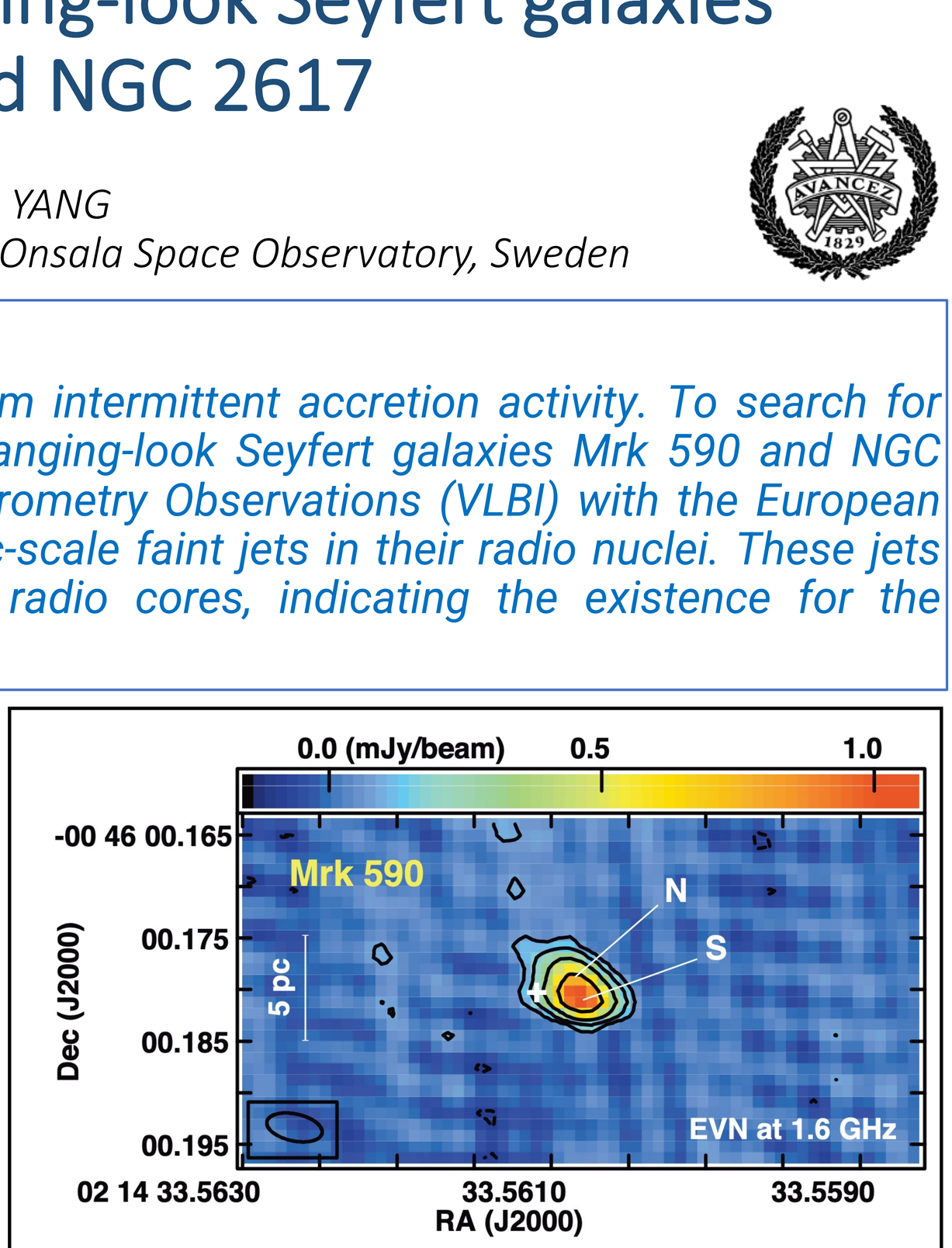


Figure 1. The EVN 1.6-GHz image of the nearby changing-look Seyfert galaxy Mrk 590 on 2015 October 16. The contours start from 2.5σ and increase by factors of −1, 1, 2, 4, and 8. The white cross denotes the optical centroid reported by the Gaia astrometry.

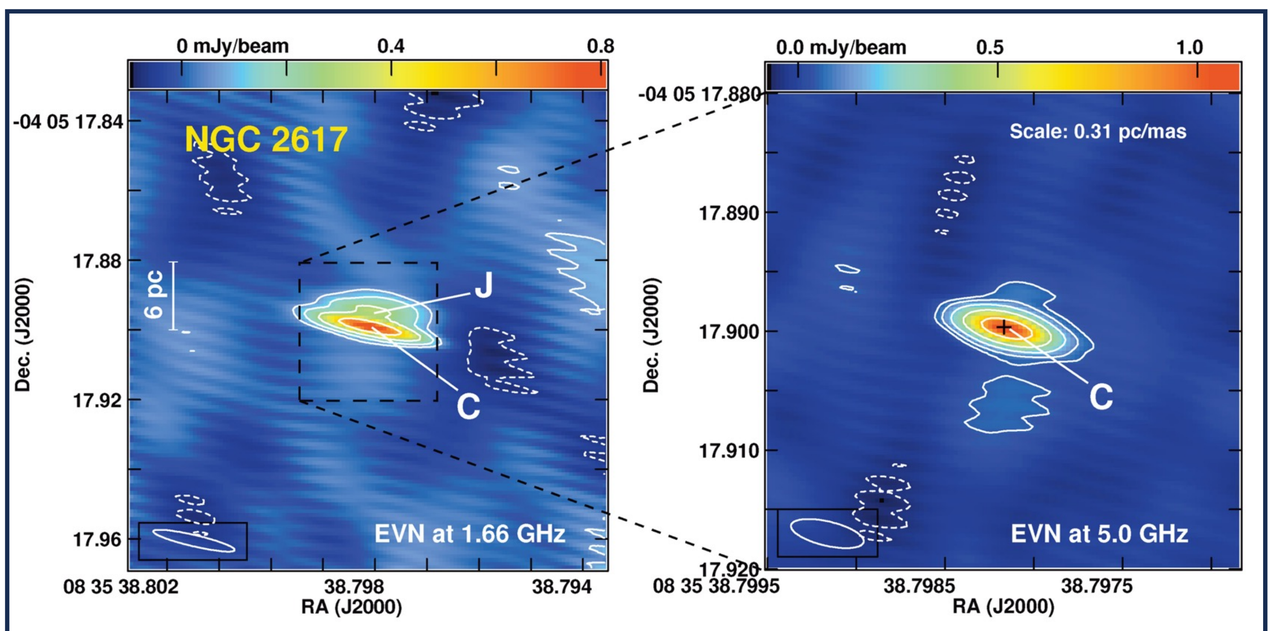
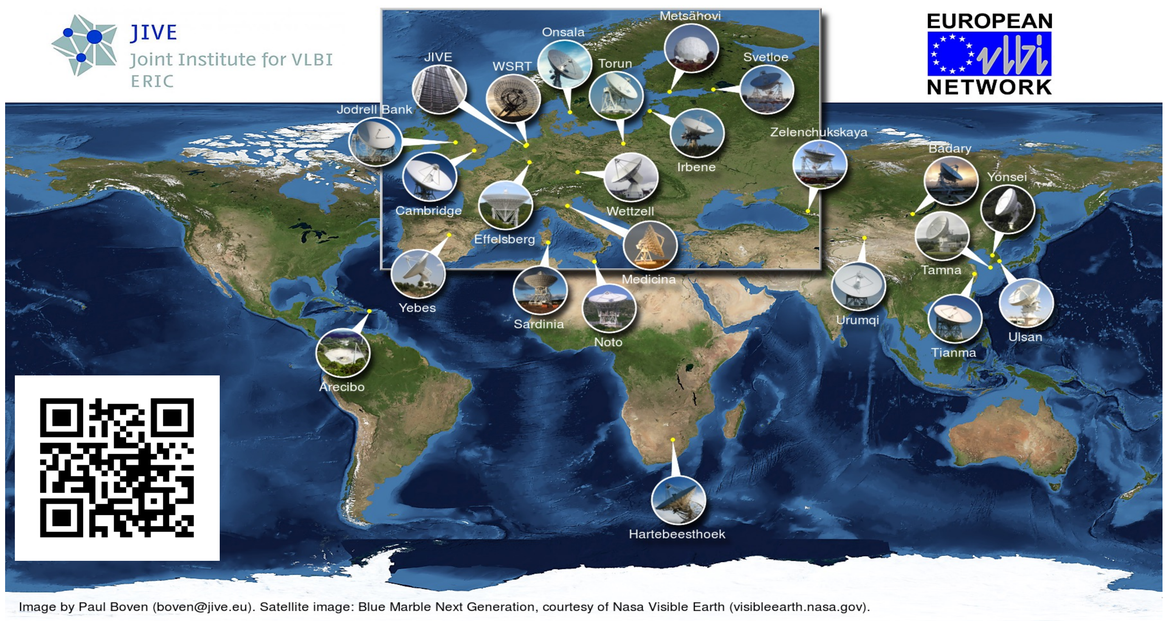


Figure 2. The faint core-jet structure in the nearby changing-look Seyfert galaxy NGC 2617. The contours start from 2.5σ and increase by factors of −1, 1, 2, 4, and 8.



NGC 2617 is a nearby face-on spiral galaxy at z=0.0142. It had an unambiguous 'inside–out' multiwavelength outburst in Spring 2013, and a dramatic Seyfert-type change probably between 2010 and 2012, with the emergence of broad optical emission lines.

With the EVN observations at 1.6 and 5 GHz, we find that NGC 2617 shows a partially synchrotron self-absorbed compact radio core with a significant core shift, and an optically thin steep-spectrum jet extending towards the north up to about 2 pc in projection. The radio core had a stable flux density of ~1.4 mJy at 5.0 GHz between 2013 June and 2014 January, in agreement with the expectation of a supermassive black hole in the low accretion rate state. The northern jet component is unlikely to be associated with the 'inside–out' outburst of 2013.

Main references & QR codes

1. Jun Yang, Ilse van Bemmel, Zsolt Paragi, S Komossa, Feng Yuan, Xiaolong Yang, Tao An, JY Koay, C Reynolds, JBR Oonk, Xiang Liu, Qingwen Wu, 2021, MNRAS, 502, L61
2. Jun Yang, Zsolt Paragi, Robert J Beswick, Wen Chen, Ilse M van Bemmel, Qingwen Wu, Tao An, Xiaocong Wu, Lulu Fan, JBR Oonk, Xiang Liu, Weihua Wang, 2021, MNRAS, 503, 3886