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C O L L O Q U I U M

Multi-wavelength Polarization of Blazars

Prof Markus Böttcher (North-West University)

DATE: Monday, 23 June 2025 | 16h00–17h00 SAST

VENUES:
- Neelsie Cinema, Stellenbosch University
- Room P215, 2nd Floor, Physics Building, University of the Witwatersrand
- Online

--- A recording of the talk will be published on the NITheCS YouTube channel afterwards ---

ABSTRACT

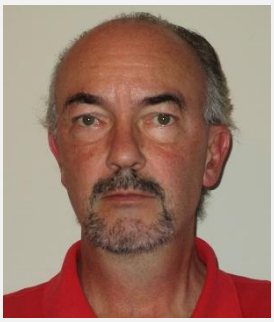
Blazars are the most numerous extragalactic sources of high-energy and very-high-energy gamma-rays and are bright and variable throughout the entire electromagnetic spectrum. Their non-thermal continuum emission is dominated by radiation from a highly relativistic jet moving closely aligned to our line of sight. Many open questions concerning the physics of particle acceleration and production of the multi-wavelength emission remain. Polarization is a key indicator of the structure of magnetic fields in these sources and the role they play in the acceleration and radiation processes. While traditionally, measurements of polarization were possible only at radio and optical wavelengths, the recent successful launch of the Imaging X-Ray Polarimetry Explorer (IXPE) has opened a new window of X-ray polarimetry. This talk will introduce the principles of the processes to produce and measure polarized multi-wavelength emission and recent results, in particular from IXPE, as well as co-ordinated multi-wavelength observations involving the High Energy Stereoscopic System (H.E.S.S. – the world's largest currently operating ground-based gamma-ray observatory) and spectropolarimetry using SALT.

BIOGRAPHY

Prof Markus Böttcher obtained his PhD in 1997 from the University of Bonn, Germany, having conducted his doctoral research at the Max Planck Institute for Radio Astronomy in Bonn. He completed a postdoctoral fellowship at Rice University in Houston, Texas (1997–2002), which included a NASA Chandra Postdoctoral Fellowship (1999–2002).

In 2002, he joined Ohio University as an Assistant Professor, was promoted to Associate Professor in 2007, and became a Full Professor in 2012. In 2013, Prof Böttcher relocated to South Africa to take up the SARChI Chair of Astrophysics and Space Physics at North-West University in Potchefstroom.

His research expertise lies in theoretical high-energy astrophysics, with a focus on extragalactic sources such as active galactic nuclei and gamma-ray bursts. He currently serves as Chair of the South African Gamma-Ray Astronomy Programme, which coordinates high-energy astrophysics research and funding efforts for approximately 100 researchers across six institutions in South Africa and Namibia.



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