

Citation for the 2018 RAS Herschel Medal: Professor Tom Marsh

The 2018 Herschel Medal is awarded to Professor Tom Marsh.

Professor Tom Marsh has undertaken pioneering research into close binary star systems for the last 30 years. Foremost among his numerous contributions has been the development of the Doppler Tomography technique, which was first described in a landmark paper in 1988 co-authored with Professor Keith Horne. The method uses phase-resolved spectra to construct two-dimensional velocity-space images, allowing astronomers to break the diffraction limit of conventional imaging.

Its application reveals the micro-arcsecond structure of close binary star systems, delivering accurate masses for white dwarfs, neutron stars and black holes. The technique unveils the detailed structure of accretion flows, including the intricate structure of accretion streams and hot-spot dynamics. It also led to the discovery of the theoretically anticipated spiral-wave patterns that appear in accretion discs during dwarf nova outbursts.

Doppler Tomography has been applied to hundreds of binary systems by numerous researchers, leading to a much improved understanding of accretion disc physics.

For these reasons, Professor Marsh is awarded the Herschel Medal.