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# 国台学术报告 NAOC COLLOQUIUM

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**Time: Wednesday 2:30PM, Sep. 03 Location: A601 NAOC**

## Gas inflow patterns and nuclear rings in barred galaxies

**Prof. Juntai Shen (Shanghai Astronomical Observatory, CAS)**

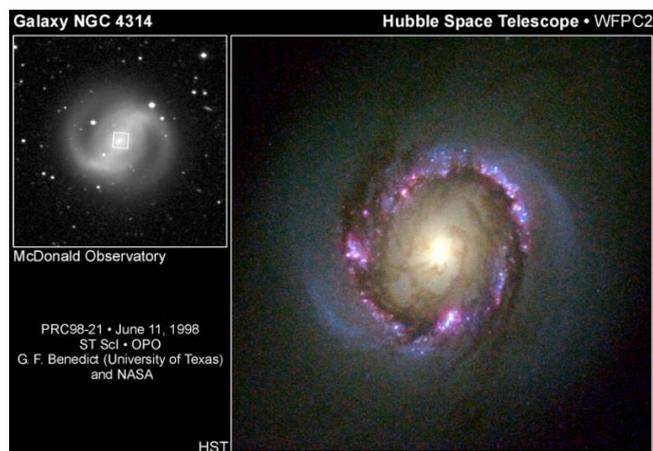


Professor Shen obtained his PhD in Astronomy from Rutgers University in USA in 2005, he then worked as a Harlan J. Smith Postdoctoral Fellow at the University of Texas at Austin from 2005 to 2009. He has been working at Shanghai Astronomical Observatory, CAS since 2009. His research covers a wide range of topics in galactic dynamics, including barred galaxies, galactic warps, dynamical modeling of the Milky Way bulge and its exotic X-shaped structure, and measuring the mass of supermassive black holes in elliptical galaxies through dynamical modeling. Many of his papers have been highlighted by internationally renowned textbooks, ARAA reviews, and the modern astronomical reference series “Planets, Stars, and Stellar Systems” (Springer Reference, 2013). He was also invited to serve as an expert reviewer on the “Galactic Structure” panel for the National Science Foundation of USA.

### Abstract

Nuclear rings, dust lanes, and nuclear spirals are common structures in the inner region of barred galaxies, with their shapes and properties linked to the physical parameters of the galaxies. We use high-resolution hydrodynamical simulations to study gas inflow patterns in barred galaxies, with special attention on the nuclear rings. The location and thickness of nuclear rings are tightly correlated with galactic properties, such as the bar pattern

speed and bulge central density, within certain ranges. We identify the backbone of nuclear rings with a major orbital family of bars. The rings form exactly at the radius where the residual angular momentum of inflowing gas balances the centrifugal force. We propose a new simple method to predict the bar pattern speed for barred galaxies possessing a nuclear ring, without actually doing simulations. We apply this method to some real galaxies and find that our predicted bar pattern speed compare reasonably well with other estimates. Our study may have important implications for using nuclear rings to measure the parameters of real barred galaxies with detailed gas kinematics.



*All are welcome! Tea, coffee, biscuits will be served at 2:15 P.M.*