

# **Discovery of a Radio Bubble Trailing PSR J1015-5719**

C.-Y. Ng (Department of Physics, the University of Hong Kong)

#### **Abstract:**

PSR J1015-5719 is a young and energetic pulsar with a characteristic age of 39kyr and a spin down luminosity of 8.3e35erg/s. We report on radio imaging observations of the field made with the Molonglo Observatory Synthesis Telescope (MOST) and the Australia Telescope Compact









ATCA

MOST





Swinburne



ATNF/CSIRO

Flux Density (mJy) Spectral Index<sup>a</sup> Region  $3\,\mathrm{cm}$  $20\,\mathrm{cm}$  $16\,\mathrm{cm}$  $6\,\mathrm{cm}$  $-0.3\pm0.1$ All  $65 \pm 10$  $45 \pm 6$  $110 \pm 30$  $60 \pm 10$  $-1.1\pm0.1$ Pulsar  $2.6 \pm 0.3$  $0.6 \pm 0.05$  $1.0 \pm 0.05$  $-0.15\pm0.06$ Bubble  $26.5 \pm 1$  $23.5 \pm 1$  $28 \pm 2$  $-0.2\pm0.2$  $19 \pm 4$  $17 \pm 2$  $14 \pm 2$ Head (excl. pulsar)  $6 \pm 2$  $-0.2 \pm 0.4$ Tail  $8 \pm 2$  $8 \pm 3$ Northeastern Blob  $5.0 \pm 0.2$  $-0.12\pm0.04$  $5.5 \pm 0.2$ Southern Blob  $4.6 \pm 0.2$  $-0.33 \pm 0.05$  $7.0 \pm 0.3$  $5.4 \pm 0.2$ ...

New Radio Observations of PSR J1015-5719

Usable Band- Integration Obs. Date Center Freq. No. of Array width<sup>a</sup> (MHz) Time (hr) Config. (MHz) Channels<sup>a</sup>

# Discussion

MOST					
2008 Apr 6		843	3	1	$4 \times 12$
ATCA					
$2008 {\rm \ Dec\ } 13$	750B	4800, 8640	13	104	12.5
$2009 \ \mathrm{Feb} \ 17$	EW352	4800, 8640	13	104	12.5
2009 Aug 2	1.5A	5500, 9000	2048	1848	11.5
2010 Feb 5	6A	5500, 9000	2048	1848	10
2011 Nov 17	1.5D	2100	2048	1848	1

<sup>a</sup>Per center frequency.

## **Reference:**

Gaensler & Slane 2006, ARA&A, 44, 17 Ng, Gaensler, Chatterjee, & Johnston 2010, ApJ, 712, 596 van der Swaluw, Downes, & Keegan 2004, A&A, 420, 937 van Kerkwijk & Ingle 2008, ApJ, 683, L159 Wang, Kaplan, Slane, Morrell, & Kaspi 2013, ApJ, 769, 122

- Bubble too small to be supernova remnant
- High polarization fraction + flat spectrum => a new pulsar wind nebula G283.1-0.59
- Caused by instability in the flow? E.g., Guitar Nebula, G319.9-0.7 (van Kerkwijk & Ingle 2008, Ng et al. 2010)

### **Acknowledgement:**

This work is supported by an ECS grant of the Hong Kong Government under HKU 709713P. The Australia Telescope is funded by the Commonwealth of Australia for operation as a National Facility managed by CSIRO.