Source Finding and Visualisation

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Large radio surveys such as those proposed for several SKA pathfinder and precursor telescopes require (automated) source-finding algorithms that are highly reliable, complete, and fast. Similarly, sophisticated visualisation tools are needed to explore the resulting survey data together with their multi-wavelength counterparts.

In this PASA Special Issue on Source Finding and Visualisation, several advanced source-finding algorithms, including novel methods for radio continuum, polarisation and spectral line surveys are described, tested and compared. The process of finding sources can be considered one of many important steps (e.g., pre-processing, source finding and characterisation, cataloguing/post-processing) in the production of astronomical source catalogues, on which much of the survey science is based.

The Australian SKA Pathfinder (ASKAP), equipped with novel Chequerboard phased array feeds, will be a powerful 21-cm survey machine. For the large volumes of ASKAP data, a special version of DUCHAMP, called SELAVY, is being developed in consultation with the ASKAP survey science teams (Whiting & Humphreys 2012). Extensive testing and comparisons of existing and new source-finding algorithms were carried out for this PASA Special Issue and are presented by Westmeier, Popping & Serra (2012), Westerlund, Harris & Westmeier (2012), Popping et al. (2012), Huynh et al. (2012), Hollitt & Johnston-Hollitt (2012), Walsh et al. (2012), George, Stil & Keller (2012), Marsh & Jarrett (2012), Allison, Sadler & Whiting (2012) and Jurek & Brown (2012). An overview on spectral line source finding and visualisation is given by Koribalski (2012), while Hassan, Fluke & Barnes (2012) look into real-time 3D volume rendering of large (Tbytes) astronomical data cubes. Among the new 3D algorithms are the 'Characterised Noise Hɪ' source finder (Jurek 2012), the '2D–1D wavelet reconstruction' (Flöer & Winkel 2012), and the 'Smooth & Clip' technique (Serra, Jurek & Flöer 2012).

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