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TIME VARIABILITY IN SIMULATED ULTRACOMPACT AND HYPERCOMPACT H II REGIONS

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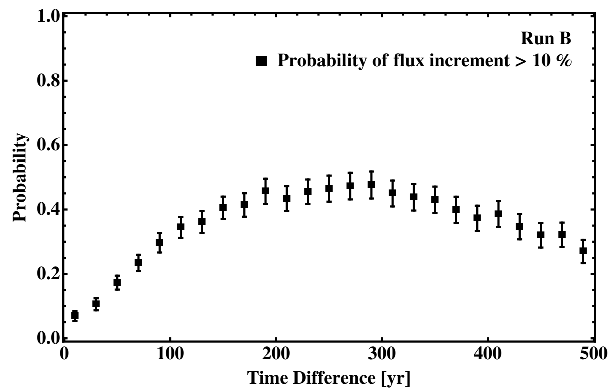
Observations of ultracompact and hypercompact H II regions have shown time variations in their radio-continuum flux (Franco-Hernández & Rodríguez 2004; Galván-Madrid et al. 2008), suggesting that (some of) these ionized regions harbor stars that are still accreting from an infalling neutral accretion flow that becomes ionized in its innermost part (Keto 2007). We present an analysis of the flux variation of H II regions formed in the simulations incorporating self-gravity and both ionizing and non-ionizing radiation presented by Peters et al. (2010a,b,c). According to this model, a small but non-negligible fraction (∼10%) of observed H II regions should have detectable flux variations (larger than 10%) in timescales of 10 years.

Radio-continuum maps at a wavelength of 2 cm were generated from the simulation output by integrating the radiative transfer equation for free-free radiation. These maps where convolved with a gaussian beam and noise was added emulating typical VLA parameters. The number counts in flux bins of the simulated H II regions were compared to the distance-normalized flux distributions of the surveys of Wood & Churchwell (1989) and Kurtz et al. (1994). Observations and simulations are in reasonable agreement. Probability distributions (PDs) as a function of time lag for variations larger than a given threshold were measured. Figure 1 shows the PDs for flux variations larger than 10%. Details of our procedures and results will appear in Galván-Madrid et al. (2011, in preparation).



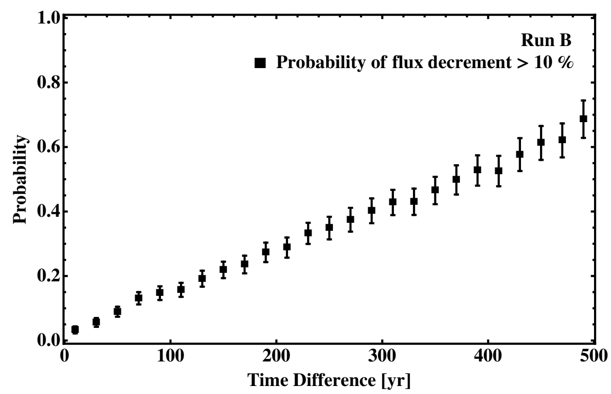


Fig. 1. Probability distributions for flux increments (top panel) and decrements (bottom panel) larger than 10% as a function of time lag. The error bars indicate the 1σ statistical uncertainty from the number of counts in each bin 20-yr wide.

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