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LOFAR

LOFAR Two-metre Sky Survey DR2: Counts-in-Cells Statistics

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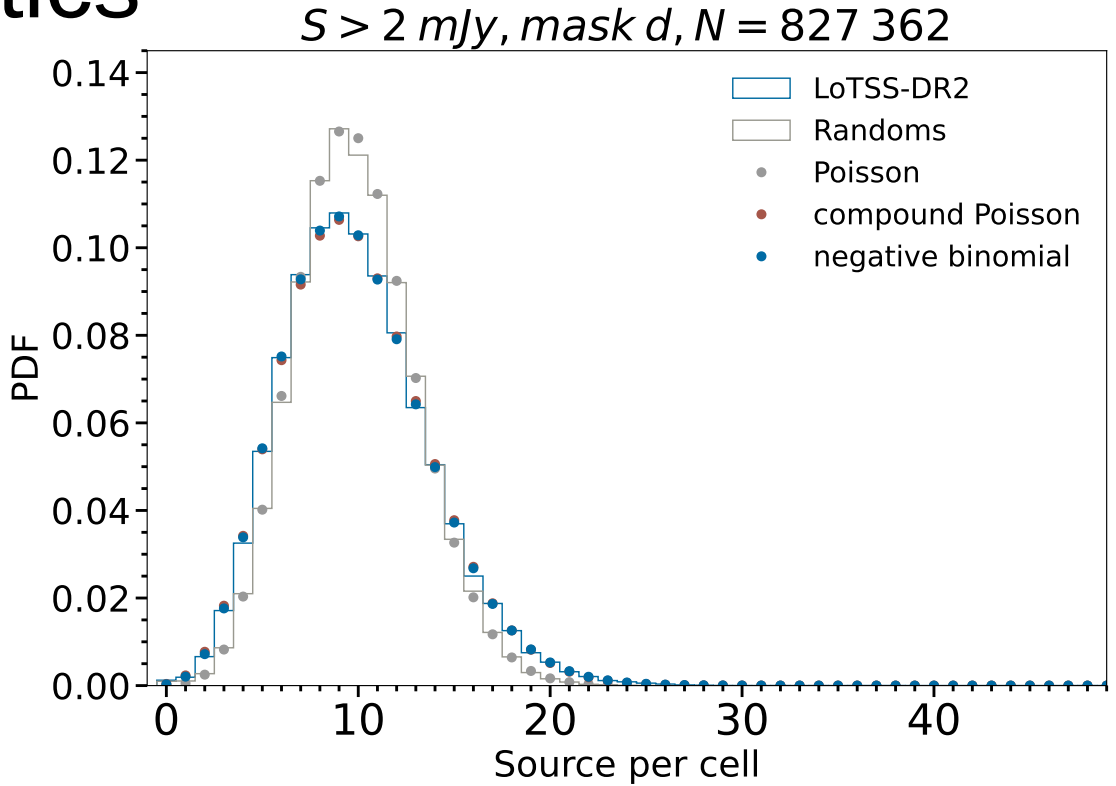
Counts-in-Cells statistics

- Cosmological principle + independent sources = Poisson distribution
- Randoms follow Poisson distribution with a deviation due to systematics considerations made by Hale et al (2024)
- Distribution of the sources can be modeled by Cox process which describes a random process within a Poisson process.
- A logarithmic distribution of components results in a negative binomial distribution has an excellent fit. In agreement with previous study for SDSS by Yang and Saslaw (2011)



Mask	S_{min}	N_{bins}	Poisson	compound Poisson	negative binomial
mask d	1 mJy	22	371.9	11.9	12.8
	2 mJy	16	319.8	11.7	7.8
	4 mJy	12	325.5	10.9	5.2
	8 mJy	9	287.1	14.9	6.4

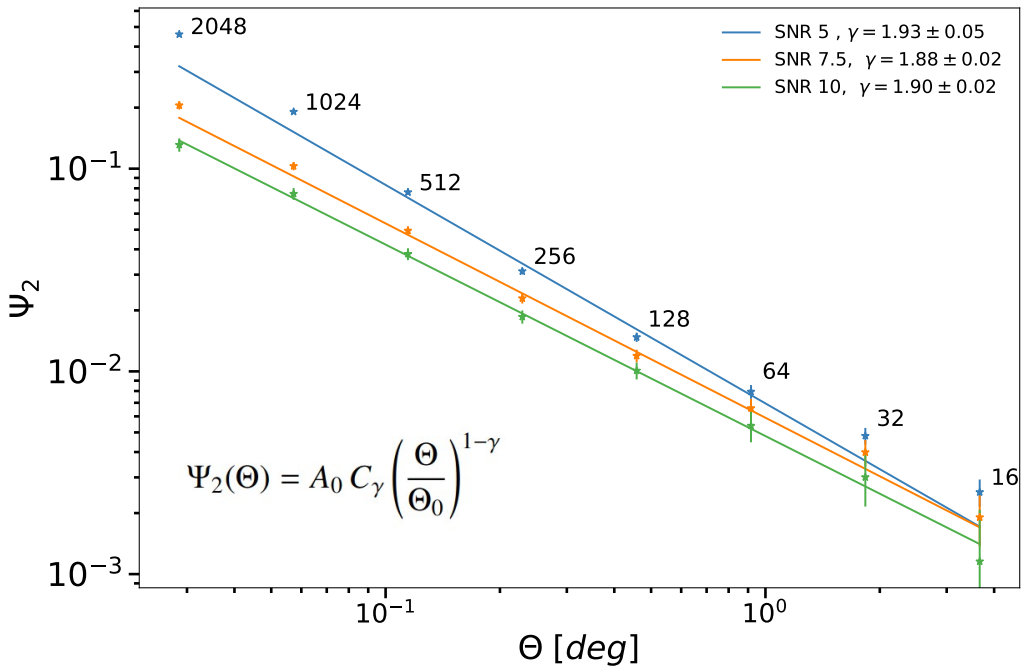
Comparison of chi-square/dof test for mask d at different flux density thresholds

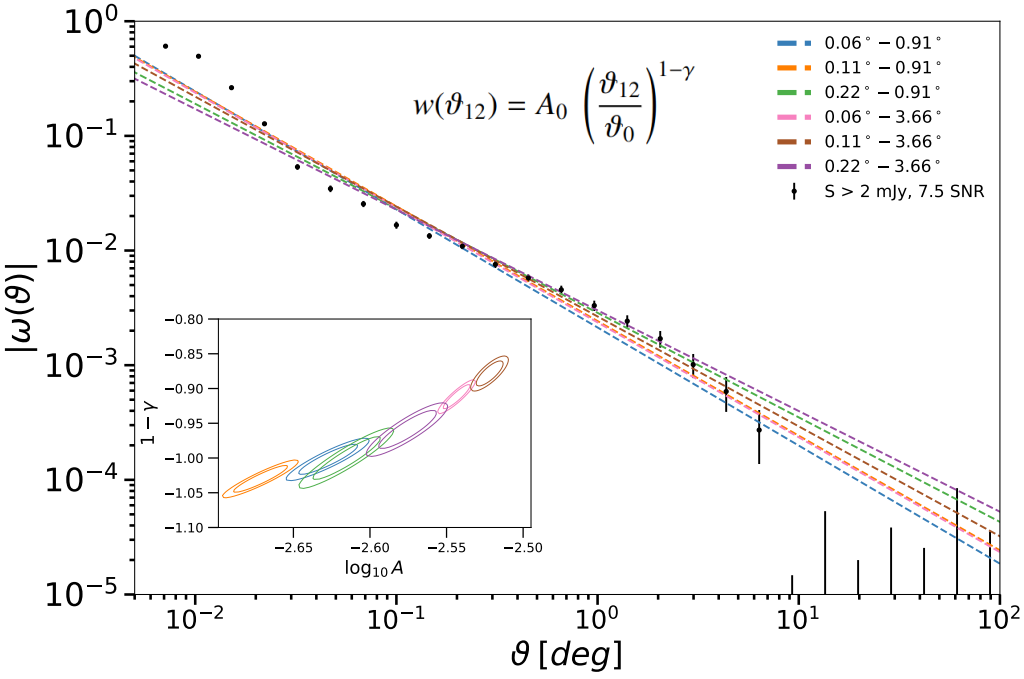
Angular correlation function

from scaling of cell sizes

$$\Psi_2 \equiv \frac{m_2 - \mu}{\mu^2} = \frac{1}{\Omega^2} \iint w(\vartheta_{12})\, d\Omega_1\, d\Omega_2$$ Peebles (1980)

$$\frac{1}{\Omega^2} \iint w(\vartheta_{12})\, d\Omega_1\, d\Omega_2 = A_0 C_\gamma \left(\frac{\Theta}{\Theta_0}\right)^{1-\gamma}$$ Totsuji & Kihara (1969)





Angular clustering from scaling of the cell sizes is consistent with the results from direct measurements, with a computationally cheaper method.