Dark matter searches towards WLM dwarf galaxy with H.E.S.S.

C. Armand[12], V. Poireau[1], L. Rinchiuso[3], E. Moulin[3]

[1] LAPP, CNRS, Annecy [2] LAPTh, CNRS, Annecy [3] CEA, Saclay

I. Goals

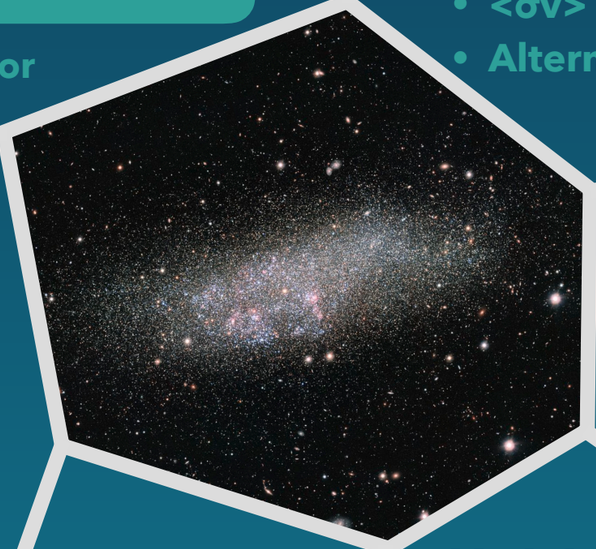
- **Search for a DM signal** in the 18h HESS data towards Wolf-Lundmark-Melotte (WLM) dwarf galaxy in a **ROI of 0.12°**
- Set **upper limits on <σv>** if no signal is detected

II. γ-ray flux

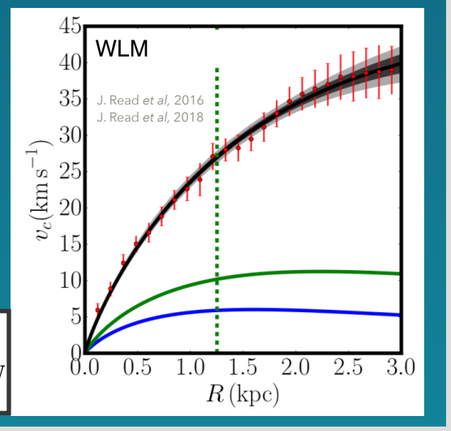
$$\frac{d\Phi_\gamma}{dE} = \frac{1}{2}\frac{\langle\sigma v\rangle}{4\pi m_\chi^2}\cdot\sum_f B_f\frac{dN_\gamma^f}{dE_\gamma}dE_\gamma \cdot \int_{\Delta\Omega}\int_{los}\rho^2_{DM}(r(s,\alpha_{int}))dsd\Omega'$$

Particle physics factor — **J factor**

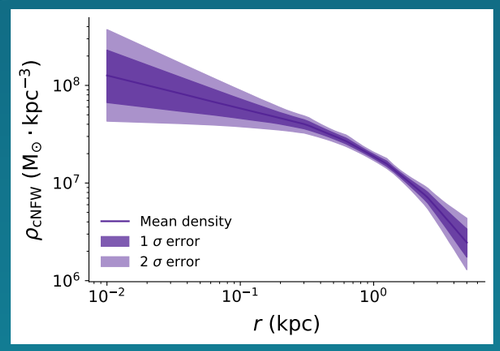
III. Properties of WLM



- **First** irregular dwarf observed by H.E.S.S. and an IACT experiment
- **Isolated** source
- Located at **~ 1 Mpc** from the Milky Way
- **Excellent** HI data, photometry and stellar kinematics
- **Smooth** rotation curve



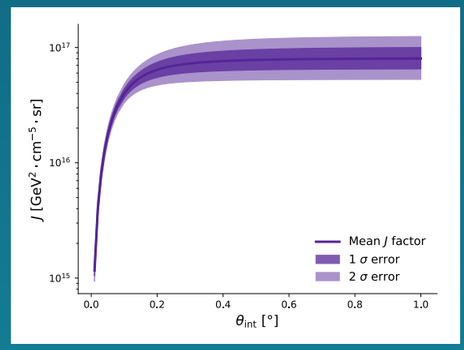
IV. coreNFW



Rotation curve **well constrained**

Small uncertainties on the DM profile

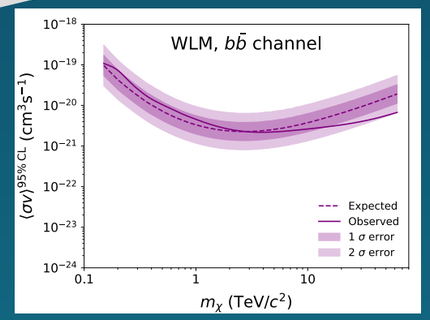
V. J factor

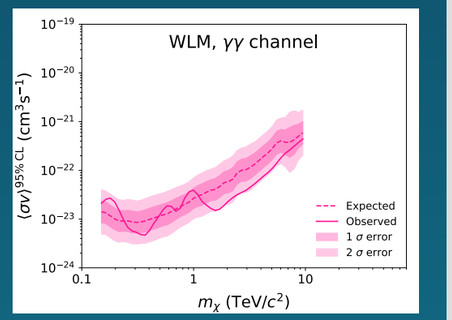


MCMC results by J. Read *et al*, 2018

Computation of **75,000** J factors

VII. Upper limits

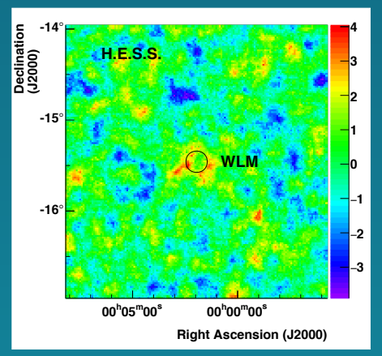




Upper limits at 95% C.L. on <σv>

using a log-likelihood ratio test statistics

VI. Results



No significant excess

VIII. Conclusion

- **No excess** has been observed in the data
- Set **upper limits** for eight annihilation channels
- **<σv> ~ 10^{-20} - 10^{-23} cm^3.s^{-1}** at 1 TeV
- **Alternative** target for CTA