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Galaxy clusters in the decameter sky

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Citation

Groeneveld, C. (2025, June 5). *Galaxy clusters in the decameter sky*. Retrieved from <https://hdl.handle.net/1887/4248185>

Version: Publisher's Version

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Propositions

accompanying the thesis

Galaxy Clusters in the Decameter Sky

1. Decameter observations from the Earth's surface are feasible and hold significant scientific value, particularly for studying galaxy clusters.
(Chapter 3,4)
2. Observations below 100 MHz with baselines ranging from hundreds to thousands of kilometers are in principle possible, but require substantial effort to produce meaningful scientific results.
(Chapter 2)
3. The diffuse emission in galaxy clusters below 30 MHz is dominated by emission from fossil plasma from active galactic nuclei, rather than by radio halos.
(Chapter 3,4)
4. Observations of radio halos are currently constrained by the challenge of separating the diffuse halo emission from discrete radio sources within galaxy clusters.
(Chapter 3, 4, 5)
5. Understanding the connection between fundamental physics and observations is critical for a good comprehension of the non-thermal plasma in galaxy clusters.
6. Radio astronomical software should strive to achieve a good balance between automation without human intervention on one hand, and flexibility to be easily modified by end users on the other hand.
7. Radio calibration is a science. Radio imaging is an art.
8. LOFAR Low-Band Antenna images alone are not particularly useful; it is their synergy with LOFAR High-Band Antenna images that unlocks the greatest scientific potential.
9. The SKA-Low is a good, albeit expensive, pathfinder for future LOFAR work.
10. The universe has no obligation to adhere to human notions of elegance or simplicity.
11. The claim that science should be "politically neutral" comes from a position of privilege.
12. Science needs old people and young people; old people to give advice, and young people to ignore the given advice.

*Christian Groeneveld
Leiden, 5 June 2025*