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Citation

Oei, M. S. S. L. (2023, December 12). *Giant galactic outflows and shocks in the cosmic web*. Retrieved from <https://hdl.handle.net/1887/3666253>

Version: Publisher's Version

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Note: To cite this publication please use the final published version (if applicable).

Giant galactic outflows and shocks in the Cosmic Web

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Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof.dr.ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op dinsdag 12 december 2023
klokke 15.00 uur

door

MARTIJN SIMON SOEN LIONG OEI

geboren te Leiden
in 1993

Promotor: prof. dr. H. J. A. Röttgering
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The size and age of the Cosmos are beyond ordinary human understanding. Lost somewhere between immensity and eternity is our tiny planetary home. In a cosmic perspective, most human concerns seem insignificant, even petty. And yet our species is young and curious and brave and shows much promise. In the last few millennia we have made the most astonishing and unexpected discoveries about the Cosmos and our place within it, explorations that are exhilarating to consider. They remind us that humans have evolved to wonder, that understanding is a joy, that knowledge is prerequisite to survival. I believe our future depends powerfully on how well we understand this Cosmos in which we float like a mote of dust in the morning sky.

Carl E. Sagan, American astronomer, in *Cosmos* (1980)

TO MY PARENTS, FOR THEIR LOVE AND SUPPORT.



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ISBN: 978-94-6419-999-4

Printed by Gildeprint – Enschede

A digital copy of this thesis is available at <https://openaccess.leidenuniv.nl>.

Design by Martijn S. S. L. Oei

The front cover shows *Alcyoneus*, a giant galactic outflow. The spine features a double dactyl composed by the author. The back cover shows the magnetic field strength within a patch of cosmic web (not necessarily *the* Cosmic Web) simulated by the TNG Collaboration. The defence invitation shows the synchrotron Milky Way.

This thesis has been typeset using \LaTeX , originally developed by Leslie Lamport and based on Donald Knuth's \TeX . The body text is set in Egenolff–Berner Garamond, a revival of Claude Garamont's humanist typeface. The formatting is based on the template 'Dissertate' from Jordan Suchow, which has been released under the permissive MIT (X11) license.

The work described in this thesis has been carried out at Leiden Observatory, which is part of the Faculty of Science at Leiden University. The research has been supported by the Vidi research programme with project number 639.042.729, which is financed by the Dutch Research Council (NWO).



