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Giant galactic outflows and shocks in the cosmic web

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Giant galactic outflows and shocks in the Cosmic Web

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MARTIJN SIMON SOEN LIONG OEI

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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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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.

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