

# DIPOLE LATTICE

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Upscaling a nano-structure

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*Every honest researcher I know admits he's just a professional amateur.  
He's doing whatever he's doing for the first time. That makes him an  
amateur. He has sense enough to know that he's going to have a lot of  
trouble, so that makes him a professional.*

— Charles F. Kettering (1876-1958) (Holder of 186 patents)

## ACKNOWLEDGEMENTS

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## ACRONYMS

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## PROLOGUE

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Atoms and molecules are far too small to be observable as individual entities, with our eyes alone. Scientists have come a long way at understanding *their* world. It has been attempted to recreate a specific micro-structure, at a scale where we can directly observe it.

The configuration we've studied here, is that of a Magnetic Dipole Lattice, viz. Magnetic Dipoles that can only rotate about their axis, placed on a grid. Their physics by itself is rather interesting and can be simulated to observe the dynamics. The experiment is expected to show the same dynamics, that of the microscopic world, except it would be directly observable.

### 1.1 PRIOR ART

TODO: Complete this part after understanding the physics and simulations on the system.





## WATCH IT GROW

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### 2.1 SENTIMENTAL INTRODUCTION

Science often seems like a blackbox that related observables. Even more often, it is rather convenient to lose touch of observables altogether, and wander in the blackbox. Performing an experiment, gets one closer to nature, to the roots of the subject.<sup>1</sup>

### 2.2 THE JOURNEY

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<sup>1</sup> This section can be skipped, without any loss of continuity.



## COLOPHON

This document was typeset using the typographical look-and-feel `classicthesis` developed by André Miede, for  $\text{\LaTeX}$ .  
The style was inspired by Robert Bringhurst's seminal book on typography "*The Elements of Typographic Style*".

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[https://github.com/toAtulArora/IISER\\_repo](https://github.com/toAtulArora/IISER_repo)