

# Meera Patel

February 22, 2026  
Dr. Panos Christakoglou  
Nikhef, Maastricht University

Dear Dr. Christakoglou,

I am writing to apply for the PhD position in Experimental High-Energy Heavy-Ion Physics with the ALICE collaboration, jointly based at Maastricht University and Nikhef. I am currently completing my Master's in Physics and Astronomy at the University of Amsterdam, working on my thesis at Nikhef, where I have developed strong skills in data analysis, hardware development, and computational methods. While my research background is in detector R&D rather than heavy ion physics, I am drawn to the rich phenomenology of heavy ion collisions and the opportunity to combine large scale data analysis with phenomenological tools in an international collaboration like ALICE.

My current research at Nikhef has given me experience that translates well to the analytical challenges of heavy ion physics. On the VULCAN experiment, I have refactored the data processing and analysis pipeline, improving efficiency by over an order of magnitude, and implemented signal processing techniques such as matched filtering to extract signals from noisy data. These skills, like working with complex datasets, identifying and reducing backgrounds, and extracting physical information from challenging measurements, are central to correlation studies like in heavy ion collisions. I have also contributed to hardware development, designing upgrades for the experimental setup using CAD, and I supervise bachelor's students in the lab. Earlier, during my Bachelor's at Boston University, I worked on the Fermilab g-2 experiment, developing particle extrapolation algorithms in C++ using CERN's GEANE package and ROOT, and building data visualization tools with Python and ROOT. I am comfortable working in C/C++, Python, Fortran, and Linux/Bash, and have experience on computing clusters at Fermilab, Nikhef, and the national Snellius supercomputer.

What draws me to this position is the breadth of physics accessible through heavy ion collisions at the LHC, probing the quark gluon plasma through azimuthal anisotropy and vorticity measurements. The opportunity to work with Run 3 and Run 4 ALICE data, and to contribute to developing the phenomenological tools needed to interpret these measurements, is appealing. I am also excited by the collaborative structure of the position, spanning Maastricht, Nikhef, and CERN. Having worked at Nikhef for my thesis, I know the environment well and value the open, international research culture.

Thank you for considering my application. I would welcome the opportunity to discuss how my data analysis and computational skills could contribute to your group's research programme.

Sincerely,  
Meera Patel

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