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## Cold Atoms at UKZN

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### Abstract content <br> &nbsp; (Max 300 words)

Since the concept was first introduced in 1975, laser cooling of atoms has become a very important tool in many fields of physics research. Using the combination of on-resonant laser cooling (to provide a velocity dependant force) and magnetic trapping (to provide a position dependant force) the magneto-optical trap (MOT) allows the routine production of an atomic samples with a large number of atoms (10<sup>10</sup> atoms) at an extremely low temperature (< 100  $\mu$ K). This allows researcher to trap, manipulate and probe cold atoms with relative ease and has lead to many significant contributions to our understanding of atomic and molecular physics, as well as precision metrology.

At UKZN we have one of the very few cold atom setups in the African continent. The focus of this presented will the experimental setup of the existing cold atom experiment in UKZN. This will entail the vacuum, laser, and magnetic field systems used to create the magneto-optical trap. Also presented will by some analysis of the cold atom setup, such as temperature, size, atomic density, as well as the dynamic properties of the system.

### Apply to be<br> considered for a student <br> &nbsp; award (Yes / No)?

No

### Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD)?

N/A

### Main supervisor (name and email)<br>and his / her institution

Prof. Francesco Petruccione

### Would you like to <br> submit a short paper <br> for the Conference <br> Pro- ceedings (Yes / No)?

yes

**Primary author:** Dr MORRISSEY, Michael (University of KwaZulu NATal)

**Co-authors:** Prof. PETRUCCIONE, Francesco (UKZN); Mrs SEMONYO, Malehohonolo (UKZN); Mr DLAMINI, Sanele (UKZN)

**Presenter:** Dr MORRISSEY, Michael (University of KwaZulu NATal)

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