

MATHEMATICS COLLOQUIUM

*Optimal criteria for magnetic fields that bind
electrons*

This talk will provide a basic introduction to the three dimensional Dirac equation that describes an electron interacting with a magnetic field. Over the years a lot of work has gone into constructing zero energy solutions, also known as zero modes, for said equation. In this talk I will explain the importance of zero modes and will show how they relate to the stability of the hydrogen atom. After presenting explicit examples, I will state necessary conditions for the magnetic field so that zero modes exist. Here, of particular interest is a sharp inequality that is optimized by a magnetic field whose field lines are interlinking circles. This pattern results from pulling back the Hopf fibration on the three sphere to three dimensional space using the stereographic projection.



THURSDAY

APRIL

18

4:30 - 5:30PM
LECONTE COLLEGE
ROOM 444



Michael Loss

School of Mathematics

*Georgia Institute of
Technology*

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