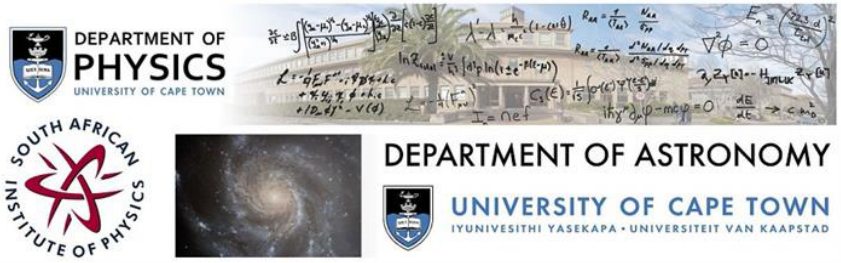

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NLO Rutherford Scattering and Energy Loss in a QGP

Wednesday, 6 July 2016 10:20 (20 minutes)

Abstract content
   (Max 300 words)
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We calculate to next-to-leading order the cross section of a massless electron scattered off of a static point charge, in which we use dimensional regularization to tame the UV divergences and electron and photon masses to regularize both soft and collinear divergences. We include all NLO diagrams from QED such as the vertex correction, vacuum polarization, electron self energy, box correction and bremsstrahlung (both soft and hard). We find that all UV divergences cancel in the MS-bar renormalization scheme, which we've chosen in order to avoid any additional divergences in the limit of taking the mass of the electron to 0. When taking the photon mass to 0, the IR divergences are canceled through an application of the Bloch-Nordsieck theorem, while the collinear divergences are canceled by the more general KLN theorem. We then investigate the importance of the BN vs. KLN theorems in various theories as we work towards computing the NLO corrections to the energy loss of a QCD particle propagating in a quark-gluon plasma.

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Dr. W. A. Horowitz
wahorowitz@gmail.com
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Primary author: Mr IBRAHIM, Abdullah (University of Cape Town)

Co-author: Dr HOROWITZ, William (University of Cape Town)

Presenter: Mr IBRAHIM, Abdullah (University of Cape Town)

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