

**Department of Chemistry**  
**Departmental Seminar:**  
**Physical, Computational & Materials Month**

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You are cordially invited to a virtual lecture presented by



**Hendrik van der Poll**

Supervised by Prof M Rademeyer

Physical Chemistry, Department of Chemistry, University of Pretoria

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**Date:** Friday, 1<sup>st</sup> October 2021

**Time:** 10:30 – 11:20

**Venue:** [Google Meet](#)

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**Introduction to Perovskites and their Application to Optoelectronics with Alkali  
Metal Halide Hybrid Perovskites as a Case Study**

A general introduction to the field of perovskites and their application will be presented, with the MSc work from Hendrik van der Poll serving as a case study. Hybrid halide perovskites have received much attention over the past two decades due to their realisation in optoelectronic applications. In this study, hybrid halide alkali metal perovskites that contained either piperazinium (piperazine-1,4-diium) or dabconium (1,4-diazabicyclo[2.2.2]octane-1,4-diium) were studied crystallographically (using single-crystal x-ray diffraction) and subsequently, their optical band gaps were determined. Specifically, the alkali metal halides NaCl, NaBr, NaI, KCl, KBr, KI, CsCl, CsBr, and CsI were combined with the aforementioned organic dications. Moreover, diffuse reflectance spectroscopy was used to measure the optical band gaps of the materials. Furthermore, selected materials from the study were employed in perovskite solar cells as either the sensitiser layer or as the electron transporting layer and the performance of these devices were compared.