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Demonstration of a new ultrafast pulse reconstruction modality – PIRANA

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**Abstract content (Max 300 words)
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Ptychography, a phase retrieval scheme used in lensless imaging, is an iterative procedure to reconstruct the phase and amplitude of an object. It has recently been shown that ptychography can be applied to reconstruct temporal objects under the condition that the illumination pulse is fully characterised. We have modified this procedure to be able to reconstruct temporal objects (recovering its amplitude and phase), with an unknown illumination pulse. In this work we explain this iterative procedure and its experimental realisation. We compare results with a known reconstruction modality such as FROG (a similar procedure for recovering the phase of a temporal object). We specifically highlight the removal of the phase ambiguity inherent in second order FROG using PIRANA.

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**Main supervisor (name and email)
and his / her institution**

Erich Rohwer egr@sun.ac.za, University of Stellenbosch

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Primary author: Mr SPANGENBERG, Dirk-Mathys (University of Stellenbosch)

Co-authors: Prof. ROHWER, Erich (University of Stellenbosch); Dr NEETHLING, Pieter (Laser Research Institute, University of Stellenbosch); Mr VILJOEN, Ruan (Stellenbosch University); Prof. FEURER, Thomas (IAP, University of Bern)

Presenter: Mr VILJOEN, Ruan (Stellenbosch University)

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