Registration Form

**Personal details:**

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| --- | --- |
| First name: | Nancy |
| Last name: | Payne |
| Passport\RSA ID number: | UK passport: 517315538 |
| Level of Study: | PhD |
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| Institution\Affiliation(s)\*: | Stellenbosch University |
| Institution Address: | Merensky Building |
| Merriman Avenue |
| Stellenbosch |
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| Are you part of a student chapter? If yes, please specify. | Yes, the Stellenbosch Laser Student Chapter |

\*Please note your affiliation(s) will be printed on your abstract in the order at which they appear and the first included on your name tag.

**Additional details:**

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| Do you require a VISA invitation letter? | | No |
| Are you applying for travel grant funding? | | No (unless this is what covers the conference fees?) |
| Are you participating in the outreach event? | | Yes |
| If yes, please write a brief description of the demonstration you will be performing (please note that this need not be complicated, but preferably interactive for the students). | Telecommunication / how light can carry information: plug in a phone/music player to a transmitter and receiver setup, where the audio (e.g., a song) is transmitted in a laser beam, and sent to speakers. Blocking the beam stops the song, partially blocking the beam decreases sound quality, etc. This will be paired with a Tyndall experiment (bottle of water, hole in bottom, water comes out with near laminar flow, pointing a laser down the stream demonstrates total internal reflection and how we can “bend” the path of laser light. These two demos tie together to explain optical fibers. | |
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| I’ll also bring along some glow in the dark boards if possible, which fluoresce wonderfully under UV. Students can write their names etc, it’s always a big hit. | |
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**Presentation details:**

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| --- | --- | --- |
| Presentation title: | | Observing Rabi oscillations in trapped Ytterbium ions |
| Presentation type: | | Poster |
| First author: | | Nancy Payne |
| Additional authors: | |  |
|  | |  |
| Abstract:\*\* |  | |
|  | Precise preparation, manipulation and detection of qubit states is crucial in quantum computing and quantum simulation. In this work we trap and cool a cloud of Ytterbium 171 ions in a linear Paul trap, using a combination of dynamic and static electric fields to confine the ions. State preparation and detection is achieved using lasers, and state manipulation is achieved with the application of microwaves to drive Rabi oscillations. The ions are driven between the two qubit states which are directly analogous to the values 0 and 1 in classical computing. Further work will be to demonstrate entanglement, with the end goal of applying such techniques to weak measurements (i.e., measurements that disturb the state of a system very little) and quantum feedback control. | |

\*\*Please note this abstract will be printed as written here so please ensure details are correct.