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To Whom It May Concern:

I am Dr. Naoki Fukata, the experimental collaborator of Prof. David Bowler and Mr. Shereif Mujahed. My current area of interest is in Si/Ge and Ge/Si core-shell nanowires for the application of next generation vertical type MOSFETs, with wider reaching application towards photovoltaic and quantum information technologies.

Ion implantation is one of the standard methods of doping in semiconductors. Control of dopant concentration and location are paramount to device efficacy and efficiency. At present, the analysis of these nanowire structures is challenging, especially with regard to dopant location and defect creation, a large factor affecting the electronic structure with this ion implantation method.

Due to the nature of these nanowires, having two materials with different mechanical properties, the understanding of how the core-shell thickness changes the penetrating power of the ions is still poorly understood. This is also a strained system, so the physics of this system is particularly rich since the strain will additionally affect penetration depth and the location post-impact.

The systems we currently synthesise are generally larger than 10nm, a system size we know to be previously out of reach for most conventional ab-initio methods. It is for this reason that we have paired up with the applicants to benefit from their ability to do such large calculations. I therefore, offer my full support their application for such a high profile project since it is only through combined experimental and theoretical calculations that we progress towards world leading device development.



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