Contribution ID: **337** Type: **Poster**

Development of High Temperature, Radiation Hard Detectors Based on Diamond.

Single crystal CVD diamond has many desirable properties compared to current, well developed, detector materials; exceptional radiation hardness and physical hardness, chemical inertness, Low Z (close to human tissue, good for dosimetry), wide bandgap (High temperature operation with lower noise, solar blind), intrinsic pathway to fast neutron detection through 12C(n,α)9Be reaction. However effective exploitation of these properties requires development of a suitable metallisation scheme to give stable contacts for high temperature applications. To utilise the available processing techniques to optimise sensor response through geometry and conversion media configurations, and to interpret experimental data, a reliable model is also required. Monte Carlo simulations of a diamond based detector have been developed using MCNP6 and FLUKA2011. These assess the performance in terms of spectral response and overall efficiency as a function of the detector and converter geometry. Sensors have been fabricated with varying metallisation schemes at Brunel University London and Micron Semiconductor Limited and subject to radiation tests including fast neutrons at SLB. Present results indicate that viable metallisation schemes for high temperature contacts have been developed and present modelling results, supported by preliminary data from partners indicate simulations provide a reasonable representation of detector response

Primary authors: METCALFE, Alex (Brunel University London); Dr SMITH, David (Brunel University London); Dr FERN, George (Brunel University London); Prof. HOBSON, Peter (Brunel University (GB))

Co-authors: Dr SALIMIAN, Ali (Brunel University London); Dr LEFEUVRE, Gwenaelle (Micron Semiconductor Ltd); SAENGER, Richard (Schlumberger)

Presenter: METCALFE, Alex (Brunel University London)

Track Classification: Semiconductor Detectors