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# Graphene Field Effect Transistor for Radiation Detection on a Micron to Millimeter Scale

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## ABSTRACT

Novel technology in radiation detection is critical to advancing radiation detectors for their many applications. Graphene has shown to be able to change its conductivity in the presence of an electric field; this makes it an excellent candidate to be used as a radiation detector for the detection of the charges generated during radiation interactions. Research has been done on making micron scale graphene field effect transistors (GFET) with graphene on a $Si/SiO_2$ wafer, but it is critical that we try to increase the scale. Unknowns persist in scaling graphene to millimeter sizes. This study plans to elucidate any of the unknowns in graphene conductivity by using 4 different sized GFETs: graphene strip sizes of 10um x 60um, 50um x 300um, 100um x 600um, and 500um x 3000um. These strips of graphene will be etched out of a graphene sheet on $Si/SiO_2$ wafers. Gold pads were connected to these strips of graphene via optical lithography. These devices will have their electrical properties characterized in future experiments to determine if mm scale graphene radiation detection is a worthwhile pursuit.

## KEYWORDS

GFET, graphene, semiconductor radiation detector