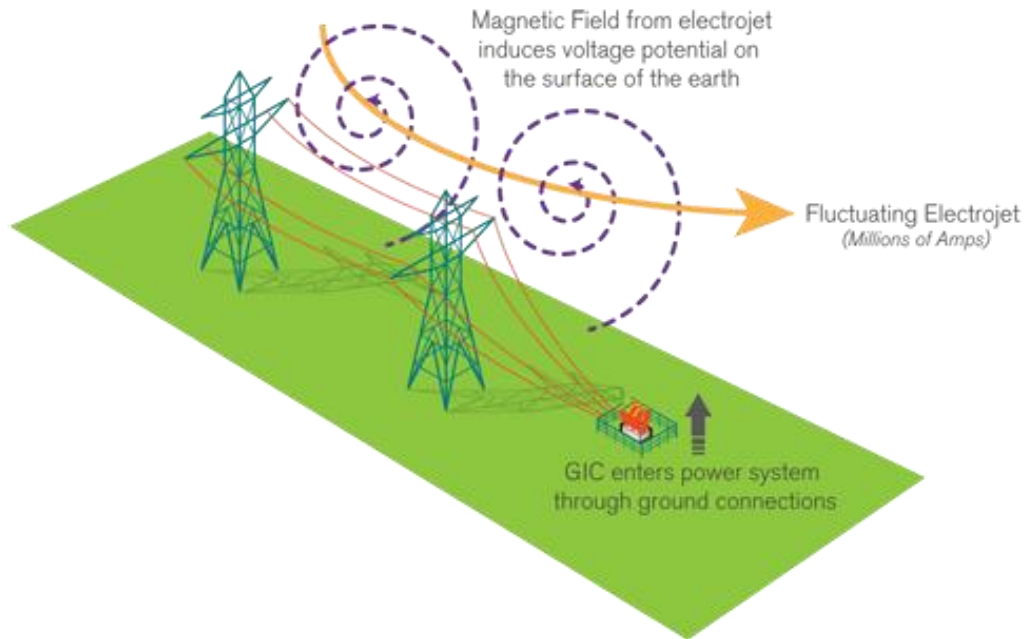


Development of a small and cost effective magnetometer

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(Figure taken from <https://www.attivitasolare.com/glossario/gic/?print=print.>)

Project statement:

During large solar storms, the Earth's magnetosphere can become highly distorted. During these rapid magnetic changes, electric fields will be induced, which can in turn induce electric currents in long power transmission cables. These geomagnetically induced currents (GICs) can potentially damage power transformers and other infrastructure, and need to be continuously monitored. This is done with a network of ground-based magnetometers, monitoring magnetic changes in near real-time.

In this project, we will develop a Raspberry Pi-based interface to read live data from a LEMI-011 magnetometer (<https://www.isr.lviv.ua/lemi011.htm>). The instrument will be built and tested at the NWU and SANSA, where after it will be deployed to the NWU's Nooitgedacht research farm, situated approximately 20km outside Potchefstroom. Using the newly developed instrument, the site's magnetic properties will be characterized, and the site's usability in hosting an observatory grade instrument will be determined.

Student development and recommended skills:

During this project the student will design and built a stand-alone magnetometer using a Raspberry Pi micro-computer. As such, advanced experience of Raspberry Pi-based detector development is recommended. Data analyses will be performed via Python, and a good grasp thereof is a prerequisite.