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ALPS: the Dark Matter Generator (coming in 2019)[1] SIMON BARKE, ZACHARY BUSH, University of Florida, CLAIRE BAUM[2], University of Illinois, HAL HOLLIS, GUIDO MUELLER, DAVID TANNER, University of Florida — Very promising dark matter candidates are axion-like particles: sub-eV particles that are expected to (weakly) interact with photons in the presence of a static electric or magnetic field. This interaction can turn photons into axions and back into photons. Hence, in order to generate axions, we will set up a 100 meter long Fabry-Perot cavity that can hold a $\approx$ 150,000 watt laser field and have a 5.3 tesla magnetic field along the entire length. If the theory holds up, a fraction of the photons should transform into relativistic axions. These axions would then propagate through any optical barrier and enter a matched cavity that is situated within an identical magnetic field. Here, some of the axions should turn back into photons of equal energy. Thus these photons resonate in the otherwise empty cavity where they can be detected. It is unknown if axion-like particles exist in the targeted mass range. However, the ALPS detection principle is very convenient because we will know the exact energy of the regenerated photons beforehand thus making a detection much easier.The final stage of the ALPS experiment will be completed by 2019 at the German Electron Synchrotron (DESY) site in Hamburg, Germany.

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