Superconducting thermoelectric detector

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I will describe our plans to create the first superconducting thermoelectric detector of electromagnetic radiation within a new EU-funded FET Open project. The idea of the detector is based on the recently discovered giant thermoelectric effect in superconductor/ferromagnet hybrid structures, where the combination of spin-split density of states and spin filtering leads to strong electron-hole asymmetry. The resulting estimated thermoelectric figure of merit ZT, including all spurious heat conduction channels, can reach values of the order of 10, much larger than the record values obtained before. This means the possibility of creating a low-noise (noise equivalent power even much below $aW/\sqrt{Hz}$ detector that does not require a bias for its read-out. In my talk I will describe the experimental and theoretical challenges in creating and understanding the detector and its physics.