Thermophotovoltaic (TPV) power systems, which convert heat into electricity using a photovoltaic diode to collect thermal radiation, have attracted increasing attention in recent work. [1,2]

Objectives
- Develop a graphical user interface (GUI) using Rappture tool kit
- Allow user to specify the materials and geometric structure of the selective emitter, filter, and TPV diode
- Plot the emittance spectrum and reflection curve as well as calculating the efficiency

Methodology
- Generate the emittance spectrum by a finite difference time-domain simulator, known as MEEP
- Use a Fourier modal method simulator, known as S4, which outputs the filter spectrum
- Both of these results are then combined with other data provided in the GUI to yield the overall TPV system efficiency

Results and discussion
- Input layers
  - The first layer is for users to specify the parameters in MEEP. The top drop-down menu contains four types of materials.
  - Two types of filter and their settings are in the second layer.

Output layers
- Overall system parameters are specified in the last layer

Conclusions and future work
We built a tool with a graphical user interface for simulating TPV system efficiency. It was successfully used to optimize component design parameters, such as filter periods and operating temperature, and can also be applied to other problems of interest to experimentalists.

References
1. TSB project with QinetiQ, Wafer Technology, Pilkington and RWE npower, “Low Bandgap Thermophotovoltaic cells for Clean Energy Generation from Waste Heat”.