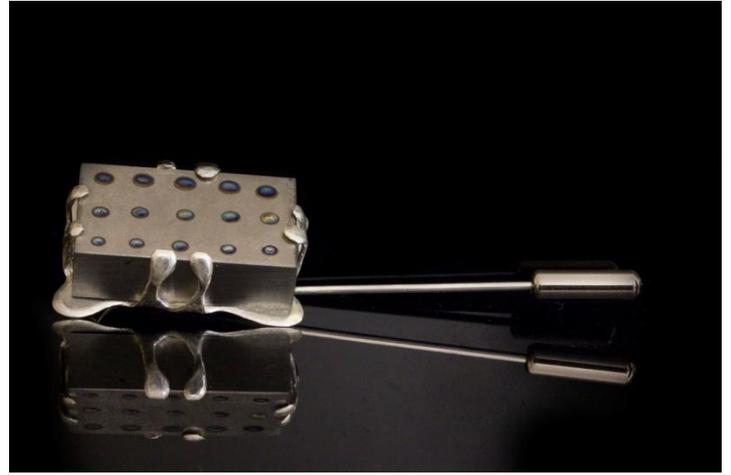


Laser Cooling and Trapping Pin

Titanium, sterling silver

Dimensions: 55 mm x 20 mm x 15 mm

Mass: 10.1 g



Laser Cooling and Trapping Pin

Image: Green Vale Gallery

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Inspiration:

Professor Stephen Chu

Stephen Chu's work in laser cooling and trapping (co-winning the Nobel Prize) and in issues related to energy are celebrated in a lapel pin made out of part of an experiment. A piece of titanium, patterned with an array of spots like trapped particles, has been set as a gem in sterling silver. Each spot is caused by the deposit of energy from a laser beam on the titanium. Involving technical staff in its production, this piece acknowledges the contributions of technicians in realising experimental physics. The silver holding this "gem" has a fluid shape, recalling the "optical molasses" of Chu's work.

Materials:

Titanium, sterling silver

Method:

A test sample of titanium, from investigations of the effects of high-power laser light on titanium (donated by Sean Tapner, technician, CAST Co-operative Research Centre, Mechanical and Mining Engineering, University of Queensland) was milled to a precise rectangular shape by Dave Perkins (technician, Physics Workshop, University of Queensland). A backing plate was sawn from sterling silver sheet, and a sterling silver pin soldered to it. The titanium piece was put in position; tabs were bent up around its sides and over the top, and hammered down. The silver on the front of the piece has been polished, and on the reverse has been given a random pattern with a rotary tool and fine abrasive.

Results:

In this piece of jewellery, a representation of trapped particles - spots of laser-induced oxidation of titanium - is held in a pool of optical molasses - silver polished to a reflective surface.

Box made for Labpunk and AIP Congress 2014, from salvaged Australian native timbers, by Gary Field (Blackheart Sassafras lid and Red Cedar body).