The electroluminescent Star Wars' light sabre

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They are a big improvement on the day-glow plastic models sold at the time of the first Star Wars blockbuster, but a high-tech toy light sabre currently on the market is sensitive to sunlight and users are restricted to fun-in-the-dark.

Professor David Officer, Director of the University's Nanomaterials Research Centre, and Centre technician Shannon Bullock, are working to optimise the electroluminescent lamps inside the sabres. The pink hue of the particular toy sabre (modelled on the sabre of Jedi Council character Mace Windu) will fade in sunlight to the un-dyed, natural, blue-green colour emitted by the electroluminescent compounds.

Image: Professor David Officer demonstrates the electroluminescence of the popular Star Wars' light sabre with research technitian Shannon Bullock.

Sold to Star Wars fans on the Internet and in the United States for between $370 and $616, the toys are powered by an ordinary 9-volt battery, and come in a variety of colours. Inside the sabre's plastic tube is a rolled up, bendy strip of plastic – the electroluminescent lamp – less than 1mm in thickness. The lamps are constructed of layers of conductive materials, including the compounds of zinc sulphide and indium tin oxide, and the electrical circuitry is screen-printed onto the plastic.

Invented by American firm, Parks Sabres, and using technology developed by Christchurch company Screen Sign Arts, the sabres have made their way to Professor Officer and the Nanomaterials Research Centre. Professor Officer says the Centre has a long association of research with the Christchurch company, which is leading the development of this type of electroluminescent technology.

Ms Bullock is studying the light emitted by the lamps, analysing its wavelength and structure, and optimising the production of white light. If they can develop the electroluminescent materials that produce white light, then that light can be dyed to a desired blend that is resistant to the damaging effects of sunlight.

The applications of this extend well beyond light sabres says Professor Officer. Once perfected, the electroluminescent lamps may replace the conventional glass bulb, which can lose up to 97 percent of its energy to heat, and which is costly to produce. Bulky, glass-tubed neon lighting could be replaced by bendy and extremely efficient plastic lamp strips. Ms Bullock's next project is to make an electroluminescent t-shirt – screen-printing the circuitry onto the fabric.

Source: Massey University