

Proposal Acronym	CapMagHTS
Proposal Title:	Specific Heat Capacity and Anisotropic Magnetic Properties of High Temperature Superconductors: YBa ₂ Cu ₃ O _{6+x} and Tl ₂ Ba ₂ CuO _{6+x} single crystals
Surname:	Kokanović
First name(s):	Ivan
Research area:	Physics PHY
Sub-discipline of research area:	Condensed Matter Physics, Superconductivity, Magnetism, Thermal properties of condensed matter
Category of research:	basic
[REDACTED]	[REDACTED]
Abstract:	<p>The primary issue addressed in this project is the existence of electron pockets in low magnetic fields caused by charge density (CDW) in the pure YBa₂Cu₃O_{6+x} single crystals. I propose to measure the specific heat and magnetisation in the doping range $0 < x < 1$ to extract the total density of states at the Fermi level and thereby determine the number of pockets. At the same time I will look for thermodynamic signatures of the CDW phase transitions. Other unresolved controversies which will be investigated include the doping evolution of the mean-field upper critical field and whether Gaussian superconducting fluctuations can account for the magnetisation and specific heat of both underdoped YBa₂Cu₃O_{6+x} and overdoped Tl₂Ba₂CuO_{6+x} single crystals at $T > T_c$. Finally, a particular emphasis of the research will be the further development of novel apparatus to measure the specific heat and magnetisation of small single crystals which are often of the highest quality.</p>
Does this proposal possess any of the sensitive ethical issues detailed in ethical issues table?:	No