

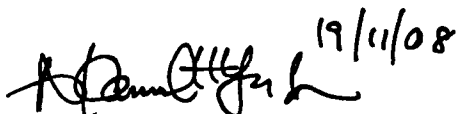
**EXCESS CONDUCTIVITY STUDIES OF $Tl_{1-x}Cu_xSr_{1.8}Yb_{0.2}CaCu_2O_{7-\delta}$
SUPERCONDUCTOR AND DIMENSIONALITY OF
SUPERCONDUCTING FLUCTUATION**

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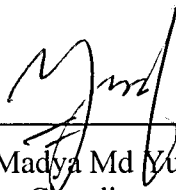
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This Final Year Project Report entitled “**Excess Conductivity Studies of $Tl_{1-x}Cu_xSr_{1.8}Yb_{0.2}CaCu_2O_{7-\delta}$ Superconductor and Dimensionality of Superconducting Fluctuation**” was submitted by Shabani Binti Ismail, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

EXCESS CONDUCTIVITY STUDIES OF $Tl_{1-x}Cu_xSr_{1.8}Yb_{0.2}CaCu_2O_{7-\delta}$ SUPERCONDUCTOR AND DIMENSIONALITY OF SUPERCONDUCTING FLUCTUATION

Effects of Cu substitutions at Tl-site, respectively, on superconducting and normal state behaviors of $Tl_{1-x}Cu_xSr_{1.8}Yb_{0.2}CaCu_2O_{7-\delta}$ ($x = 0-0.6$) ceramics have been investigated. Temperature-dependent resistance measurements on $Tl_{1-x}Cu_xSr_{1.8}Yb_{0.2}CaCu_2O_{7-\delta}$ ($x = 0-0.6$) showed optimum superconductivity for $x=0.4$ with $T_{c\ onset}$ of 92.5K and $T_{c\ zero}$ of 77.6K. In addition, superconducting fluctuation was studied in sintered polycrystalline sample of $Tl_{1-x}Cu_xSr_{1.8}Yb_{0.2}CaCu_2O_{7-\delta}$ ($x = 0-0.4$) by electrical resistivity measurement. The behavior of excess conductivity with Cu-substitution was investigated. Analysis of excess conductivity based on Aslamazov – Larkin (AL) theory revealed transition from 2D to 3D behavior of superconducting fluctuation in the mean-field region $-4 < \ln \epsilon < -1$ for samples ($x = 0-0.4$). The studied also suggest that there is a close correlation between the amounts of Cu-substitution and the behavior of superconducting fluctuation constant (AL) both 2D and 3D fluctuation. Increase the Cu-substitution caused the superconducting fluctuation constant (AL) for 2D generally decrease but for 3D showed no trend. The superconducting fluctuation constant (AL) both 2D and 3D showed optimum value for $x = 0.1$ with A_{2D} of 0.13 and A_{3D} of 0.21.