



## SEMINAR SENINAN DEPARTEMEN FISIKA FSAD ITS TAHUN KE-20

**Seminar** : A7  
**Narasumber** : Prof. Suasgoro  
**Bentuk** : Offline  
**Tempat/Link** : Teater B  
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**Waktu** : 13.15 - 15.10 WIB

### JUDUL: MAGNETIC IMPREGNATION ON $K_{0.5}Na_{0.5}NbO_3$ THROUGH MULTIFERROIC DOPING

**Abstrak:**

*The  $(K_{0.5}Na_{0.5})NbO_3$  composition was prepared through solid-state reaction while doping material  $BiFeO_3$  through the sol-gel self-combustion method. The magnetic impregnation occurred in conjunction with dopant dissolve into the matrix, the method adopts standard procedure of ceramic processing, calcination at  $575^{\circ}C$  for 6 hours, then sintering at  $1100^{\circ}C$  for 2 hours. The characterization includes X-ray diffraction (XRD), X-ray spectroscopy (XAS), and superconducting quantum interference device (SQUID) magnetometer. The crystal structure of the studied material was tetragonal at room temperature. XANES Fe K-edge analysis revealed that the absorption energies consist of quadrupole transition  $1s \rightarrow 3d$  ( $t_{2g}$  and  $e_g$ ) and dipole transition  $1s \rightarrow 4p$  ( $p_{\pi}$  and  $p_{\sigma}$ ). These energies were higher than that of  $Fe_2O_3$  suggesting the oxidation state of Fe was a mixture of  $3+$  and  $4+$ , thereby creating defects in the structure  $Fe''_{Nb}$ ,  $Fe'_{Nb}$  and influencing magnetization. The diamagnetic  $(K_{0.5}Na_{0.5})NbO_3$  becomes para-ferromagnetic after dopant  $BiFeO_3$  dissolved in the matrix. It is believed that the origin of the magnetic moment is  $3d$  unpaired electrons of Fe occupied in octahedron  $BO_6$  and influenced by the existence of interaction  $Fe^{3+}-O^{2-}-Fe^{4+}$  of side by side octahedron.*