

# **Numerical Simulation and Design of the Air Conditioning System for the 3GeV TPS Electron Storage Ring**

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Having been running the Taiwan Light Source (TLS) for twelve years, National Synchrotron Radiation Research Center (NSRRC), Taiwan has proposed to build a photon source (TPS) in the near future. TPS is preliminarily designed with 3.0 GeV in energy, 518.4m in circumference and 24 Double-Bend Achromat (DBA). Thermal effect is one of the most critical considerations for designing such an advanced accelerator. This research designed the Air Conditioning (AC) system for the TPS and applied Computational Fluid Dynamic (CFD) technique to simulation the air flow and temperature distribution in the storage ring. In the 3-dimensional CFD simulation, vacuum chambers, magnets of the booster and the storage ring, girders and supplied and return wind ducts are modeled. The spatial and temporal temperature variations and air flow were demonstrated through the numerical simulation. The cooling load and capacity of the AC system are estimated. The layouts of Air Handling Units (AHU) and wind ducts has been designed and demonstrated in 3-dimensional drawing.