

# **Numerical Simulation and Air Conditioning System Improvement for the Experimental Hall at TLS**

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This paper presents the air temperature analysis and control improvement for the experimental hall at the Taiwan Light Source (TLS). The inner and outer diameters and height of the donut-shaped experimental hall are 29m, 80m and 11.7m, respectively. Total seventy-two temperature sensors are installed in this zone, where sixty sensors are installed along the beamlines to on-line record the air temperature history. Because more and more experimental apparatuses were installed in the experimental hall, the cooling capacity of the air-conditioning (AC) system became insufficient for both experimental thermal requirements and human comfort. The temporal temperature variation may be more than 2 degree C in one day. The spatial temperature difference is also about 2 degree C. To cope with those problems, a computational fluid dynamics (CFD) code is applied to simulate the 3-dimensional temperature distribution in the experimental hall. The AC cooling capacity had also been increased accordingly to improve the temperature control in the experimental hall last year.