

Fluids and Space Engineering Seminar

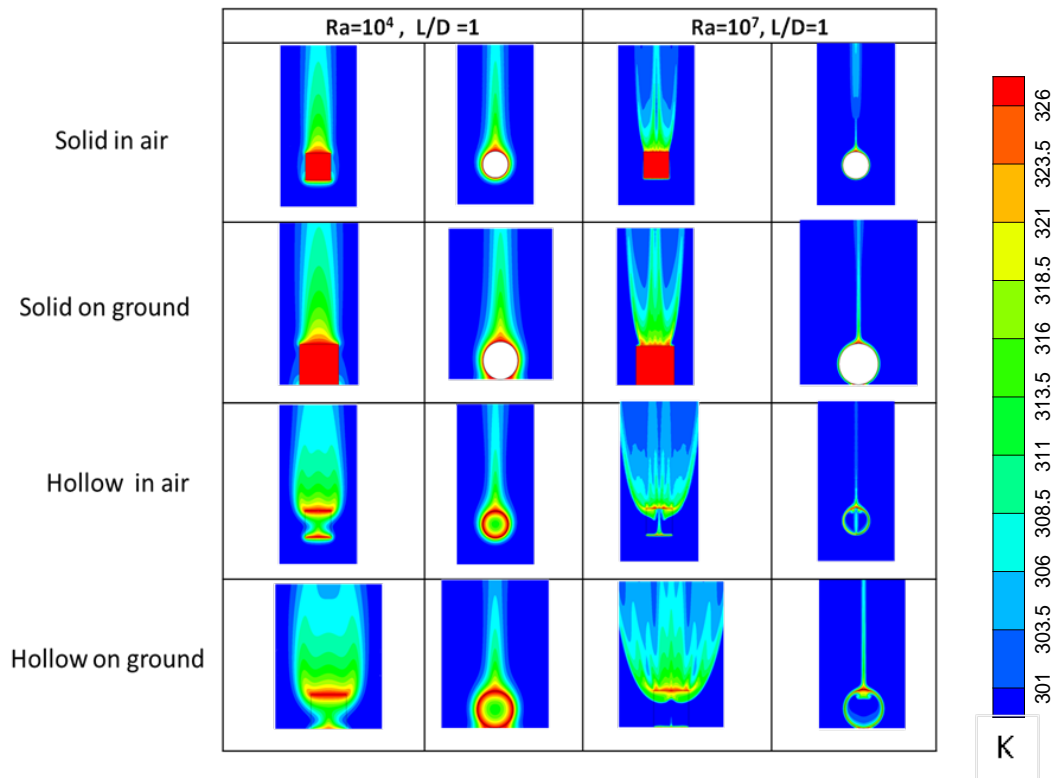
Date: Wednesday, May 30, 2018 at 13:00

Location: ZARM, Room 1730

Natural convection heat transfer from solid or hollow cylinders lying on ground or suspended in air: A numerical simulation

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Thermal plume around the solid or hollow cylinder when lying on ground or suspended in air.

Numerical simulations have been conducted to study natural convection heat transfer from solid or hollow cylinders in the laminar range of Ra spanning from 10⁴ to 10⁸ for L/D in the range of 0.05 ≤ L/D ≤ 20. Interesting flow structures around the thin hollow cylinder have been observed for small and large L/D. It has been found that the average Nu for solid or hollow horizontal cylinders in air is marginally higher than when they are on ground for the entire range of L/D and Ra limited up to 107. Up to a Ra of 107 Nu for a solid cylinder in air is higher than that of Nu for a hollow cylinder in air but when Ra exceeds 107 Nu for a hollow cylinder is marginally higher than that of the solid cylinder until an L/D of 0.2. When, L/D rises beyond 0.2 the situation reverses causing Nu for a solid cylinder to be again higher than that of the hollow cylinder when suspended in air. A solid cylinder on ground has higher Nu compared to that of a hollow cylinder on ground up to a Ra of 106. However, for higher Ra of 108 a hollow cylinder on ground has higher Nu compared to that of a solid cylinder on ground until an L/D of 5 and after that the situation reverses again.