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Experimental Investigation of Flow trough a Mechanical Heart Valve FARIDA HAJI-ESMAEILI, PETER OSHKAI, Department of Mechanical Engineering, University of Victoria, BC, Canada — Turbulent flow trough a model of a mechanical heart valve is investigated using digital particle image velocimetry. The valve leaflets are represented by flat plates mounted in a duct. The emphasis is on the effect of the valve design on the platelet activation state associated with the resulting flow field. Global quantitative images corresponding to multiple planes of data acquisition provide insight into the three-dimensional nature of the flow. Turbulent flow structures including jet-like regions and shed vortices are characterized in terms of patterns of instantaneous and time-averaged velocity, vorticity, and streamline topology. Potential of bileaflet heart valves for being thrombogenic is assessed by quantitative comparison of the associated flow fields in terms of maximum values of turbulent stresses and platelet activation states.

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