Applications of the immersed boundary method: mathematical model and numerical simulation of particle sorting

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The immersed boundary (IB) method (which was introduced by Charles Peskin in the nineties to study flow patterns around heart valves) is a useful method for problems of fluid - structure interaction. This method is both a mathematical formulation and a numerical scheme. In this talk we discuss the basic structure of the IB method and use it to provide a mathematical model and numerical simulation of

1. Surface Acoustic Wave (SAW) actuated cell sorting and

2. Enantiomer separation using counter rotating vortices generated by a quadrupolar force density

in a micro fluid channel.