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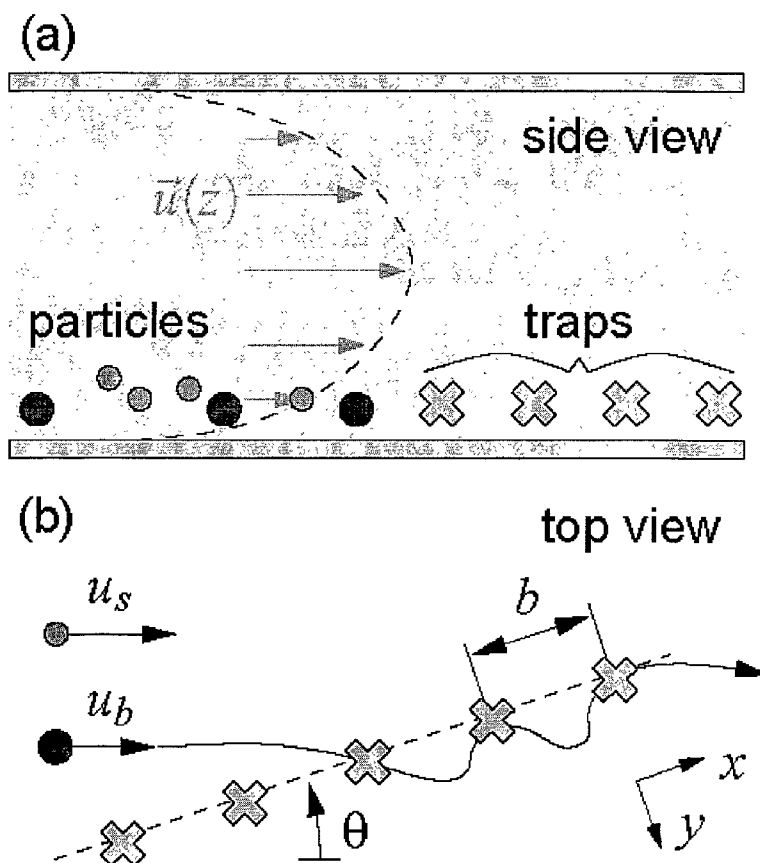
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(54) Title: OPTICAL FRACTIONATION METHODS AND APPARATUS



(57) Abstract: Static arrays of optical traps can be used to sort microscopic objects with exponential sensitivity to size. Such optical fractionation relies on competition between an externally applied force and the moving objects' differing affinities for optical gradient traps. In a reverse fractionation method, objects that are more strongly influenced by the traps tend to become kinetically locked in to the array and are systematically deflected back into an input flow. In a thermal ratcheting method, patterns are spaced to allow particle diffusion, thus providing the opportunity for forward or reverse movement through the patterns. Unlike other sorting techniques, optical fractionation can operate continuously and can be continuously optimized. The exponential sensitivity arises quite generally from the particle size dependence of the potential wells' apparent widths.



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