ABSTRACT

Provided is an apparatus and method for interacting with objects of interest. A filtering apparatus can comprise a channel system, through which objects of interest are able to diffuse. The channel system can comprise a channel of suitably configured non-uniform cross-sectional area along the length of the channel. In some embodiments, the channel system can be provided by a suitably configured porous bulk material. In some embodiments, channel system can comprise an interior chamber comprising filtered objects, where the filtered objects are contained on a first side by a first filtering surface, such as a semi-permeable membrane, and on a second side by second filtering surface, where the cross-sectional areas of a representative channel of the first and second filtering surfaces are not identical. The filtered objects can also be configured to interact with an externally applied body force, such as an electric field acting on charged filtered objects. The channel system is configured to interact with objects of interest on a scale which is smaller than a value several orders of magnitude larger than the mean free path of an object of interest. Some embodiments are configured to interact with particles, such as air molecules, water molecules, or aerosols. Other plate embodiments are configured to interact with waves or wavelike particles, such as electrons, photons, phonons or acoustic waves.