

magnetic moments when subjected to an applied magnetic field or current pulse to produce in total a local magnetic field that is capable of attracting and restraining and subsequently releasing magnetic particles near the magnetic traps.

16. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 9, wherein the plurality of magnetic traps each comprise a multilayered spin-valve structure having the following sequence of layers: a layer of tantalum, a layer of Permalloy, a layer of cobalt, a layer of copper, a layer of cobalt, a layer of Permalloy, a layer of IrMn and a layer of tantalum, wherein the layers of Permalloy can selectively have either parallel or anti-parallel magnetic moments when subjected to an applied magnetic field or current pulse to produce in total a local magnetic field that is capable of attracting and restraining and subsequently releasing magnetic particles near the magnetic traps.

17. A method of manipulating magnetic particles according to claim 9, wherein each of the magnetic traps are arranged in an array and are sized to attract and restrain individual cells, molecules, or polymers that are magnetically tagged.

18. A method of manipulating magnetic particles according to claim 9, further comprising selectively applying a

second auxiliary magnetic field to one or more of the plurality of magnetic traps to cause at least one or more magnetic particles held by the local magnetic fields to rotate or move.

19. A method of manipulating magnetic particles according to claim 9, further comprising selectively applying a second magnetic field to one or more of the plurality of magnetic traps to cause at least one or more magnetic particles held by the local magnetic fields to be placed under tension or torsion.

20. A method of manipulating magnetic particles according to claim 9, further comprising using a moving magnetic tipped probe to provide a second auxiliary field to move one or more of the magnetic particles to desired locations near the magnetic traps.

21. A method of manipulating magnetic particles according to claim 20, wherein the magnetic tipped probe comprises a magnetic force microscope cantilever.

22. A method of manipulating magnetic particles according to claim 11, wherein the membrane is transparent.

23. The microfluidic platform of claim 1 in combination with a magnetic force microscope cantilever.

* * * * *