Claims

1. A memory device comprising

a ferromagnetic data nanowire,

a ferromagnetic driver nanowire~~,~~ disposed parallel to the data nanowire,

a read element and/or a ~~spaced~~ write element positioned ~~about~~ adjacent the data nanowire,

wherein driving a domain wall in the driver nanowire remotely drives a domain wall in the data nanowire past the read element and/or the write element.

2. The memory device ~~in~~ of claim 1 wherein a first spin polarized current in the driver nanowire remotely drives a first transverse domain wall along the data nanowire.

3. The memory device ~~in~~ of claim 2 wherein ~~and~~ the data nanowire and/or the driver nanowire have in-plane magnetization.

4. The memory device ~~in~~ of claim 2 ~~or 3~~ wherein multiple transverse domain walls are transferred along the data nanowire.

5. The memory device ~~in~~ of claim 2 wherein a second larger spin polarized current bypasses a second transverse domain wall in the data nanowire.

6. The memory device ~~in any preceding~~ of claim 1 wherein the data nanowire and the driver nanowire are spaced ~~by less than~~ apart within a predetermined threshold.

7. The memory device ~~in any preceding~~ of claim 4 wherein all of the transverse domain walls in the data nanowire are aligned.

8. The memory device ~~in any preceding~~of claim 1 wherein the data nanowire and/or the driver nanowire are fabricated from $Ni_{80}Fe_{20}$ or $Ni_{81}Fe_{19}$ or Co/Ni.

9. The memory device ~~in any preceding~~ of claim 1 wherein a width of the data nanowire and/or the driver nanowire is approximately 100 nm and ~~the~~ a thickness ~~is~~ of the data nanowire and/or the driver nanowire is less than approximately 6 nm.

10. The memory device ~~in~~ of claim 1 wherein the data nanowire and/or the driver nanowire have perpendicular magnetization.

11. The memory device ~~in~~ of claim 10 wherein the data nanowire and/or the driver nanowire are fabricated from Co/Ni or CoFeB.

12. The memory device ~~in~~ of claim 11 wherein the data nanowire and/or the driver nanowire are fabricated from $Co_{40}Fe_{40}B_{20}$.

13. The memory device ~~in~~ of claim 12 wherein drive current applied to the driver nanowire switches ~~the~~ a transverse ~~verse~~ domain wall from a Bloch wall to a Neel wall.

14. The memory device ~~in~~ of claim 13 further comprising a spacer layer made of MgO between the data nanowire and the driver nanowire.