

ABSTRACT**Magnetic device and a method for forming the magnetic device**

A magnetic device 100 is described in an embodiment. The magnetic device 100 comprising: a magnetic layer 102 having a ferromagnetic phase to support magnetic skyrmions and an antiferromagnetic phase to annihilate magnetic skyrmions, the magnetic layer 102 being capable of transiting between the ferromagnetic phase and the antiferromagnetic phase; a ferroelectric layer 104 adapted to magnetoelectrically couple with the magnetic layer 102 to cause the magnetic layer 102 to transit between the ferromagnetic phase and the antiferromagnetic phase in response to a polarization state of the ferroelectric layer 104, the polarization state includes a first polarization state corresponding to the ferromagnetic state and a second polarization state corresponding to the antiferromagnetic state; and a first electrode 106 and a second electrode 108 sandwiching the magnetic layer 102 and the ferroelectric layer 104, the first electrode 106 and the second electrode 108 being adapted to receive an applied voltage for switching the polarization state of the ferroelectric layer 104 to control a phase transition of the magnetic layer 102 between the ferromagnetic phase and the antiferromagnetic phase to create or annihilate magnetic skyrmions in the magnetic layer 102. A method 200 for forming the magnetic device is also described.

[Figure to publish with abstract: Figure 1]