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(71) Applicant (for all designated States except US): **NEW YORK UNIVERSITY** [US/US]; 70 Washington Square South, New York, NY 10012 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KENT, Andrew** [US/US]; 110 Bleecker Street, #3d, New York, NY 10012 (US). **OZYILMAZ, Barbaros** [TR/US]; 183 Park Place, Brooklyn, NY 11238 (US). **GONZALEZ GARCIA, Enrique** [ES/US]; 723 Long Lake Dr., Orlando, FL 32765 (US).

(74) Agents: **LUDWIG, Peter, S.** et al.; Darby & Darby P.C., P.O. Box 770, Church Street Station, New York, NY 10008-0770 (US).

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(54) Title: HIGH SPEED LOW POWER MAGNETIC DEVICES BASED ON CURRENT INDUCED SPIN-MOMENTUM TRANSFER

(57) Abstract: A high speed and low power method to control and switch the magnetization direction and/or helicity of a magnetic region in a magnetic device for memory cells using spin polarized electrical current. The magnetic device comprises a reference magnetic layer with a fixed magnetic helicity and/or magnetization direction and a free magnetic layer with a changeable magnetic helicity. The fixed magnetic layer and the free magnetic layer are preferably separated by a non-magnetic layer, and the reference layer includes an easy axis perpendicular to the reference layer. A current can be applied to the device to induce a torque that alters the magnetic state of the device so that it can act as a magnetic memory for writing information. The resistance, which depends on the magnetic state of the device, is measured to thereby read out the information stored in the device.



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