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Charge-induced spin torque in Weyl semimetals[1] DAICHI KUREBAYASHI, KENTARO NOMURA, Institute for Materials Research, Tohoku University — In this work, we present phenomenological and microscopic derivations of spin torques in magnetically doped Weyl semimetals. As a result, we obtain the analytical expression of the spin torque generated, without a flowing current, when the chemical potential is modulated. We also find that this spin torque is a direct consequence of the chiral anomaly. Therefore, observing this spin torque in magnetic Weyl semimetals might be an experimental evidence of the chiral anomaly. This spin torque has also a great advantage in application. In contrast to conventional current-induced spin torques such as the spin-transfer torques, this spin torque does not accompany a constant current flow. Thus, devices using this operating principle is free from the Joule heating and possibly have higher efficiency than devices using conventional current-induced spin torques.

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