

# Strongly Enhanced $1/f$ Noise in the Diluted Magnetic Semiconductors (Ga,Mn)As and (Ga,Mn)P

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Diluted magnetic semiconductors are promising candidates for future spintronics applications. In the case of (Ga,Mn)As and (Ga,Mn)P, a ferromagnetic order between substitutional Mn ions is mediated by holes, but there is no consensus on the development of spontaneous magnetization. An intriguing theoretical concept is the percolation of magnetic polarons as a possible origin [1]. Motivated by results of a diverging  $1/f$  noise magnitude in  $\text{EuB}_6$ , where the existence of percolating nanoscale magnetic clusters has been demonstrated [2], we study the low-frequency carrier dynamics by fluctuation spectroscopy. Besides insights into the defect physics of the materials, we find indications for an electronic phase separation in samples with localized charge carriers, which we compare with the results for metallic (Ga,Mn)As.

## References:

- [1] A. Kaminski and S. Das Sarma, Phys. Rev. Lett. **88**, 247202 (2002)
- [2] P. Das et al., Phys. Rev. B **86**, 184425 (2012)