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(54) **MAGNETIC NANOPARTICLES, MAGNETIC DETECTOR ARRAYS, AND METHODS FOR THEIR USE IN DETECTING BIOLOGICAL MOLECULES**

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(57) **ABSTRACT**

Magnetic nanoparticles and methods for their use in detecting biological molecules are disclosed. The magnetic nanoparticles can be attached to nucleic acid molecules, which are then captured by a complementary sequence attached to a detector, such as a spin valve detector or a magnetic tunnel junction detector. The detection of the bound magnetic nanoparticle can be achieved with high specificity and sensitivity.