

SPIN VALVE MAGNETORESISTIVE SENSOR WITH ANTIPARALLEL PINNED LAYER AND IMPROVED EXCHANGE BIAS LAYER, AND MAGNETIC RECORDING SYSTEM USING THE SENSOR

ABSTRACT

A spin valve magnetoresistive (SVMR) sensor uses a laminated antiparallel (AP) pinned layer (70) in combination with an improved antiferromagnetic (AF) exchange biasing layer (57). The pinned layer (70) comprises two ferromagnetic films (72, 74) separated by a nonmagnetic coupling film (73) such that the magnetizations of the two ferromagnetic films (72, 74) are strongly coupled together antiferromagnetically in an antiparallel orientation. This laminated AP pinned layer (70) is magnetically rigid in the small field excitations required to rotate the SVMR sensor's free layer. When the magnetic moments of the two ferromagnetic layers (72, 74) in this AP pinned layer (70) are nearly the same, the net magnetic moment of the pinned layer (70) is small, but the exchange field is correspondingly large. The laminated AP pinned layer (70) has its magnetization fixed or pinned by an AF material that is highly corrosion resistant but that has an exchange anisotropy too low to be usable in conventional SVMR sensors.

Fig. 5