GMW Projected Field Electromagnet, Model 5201

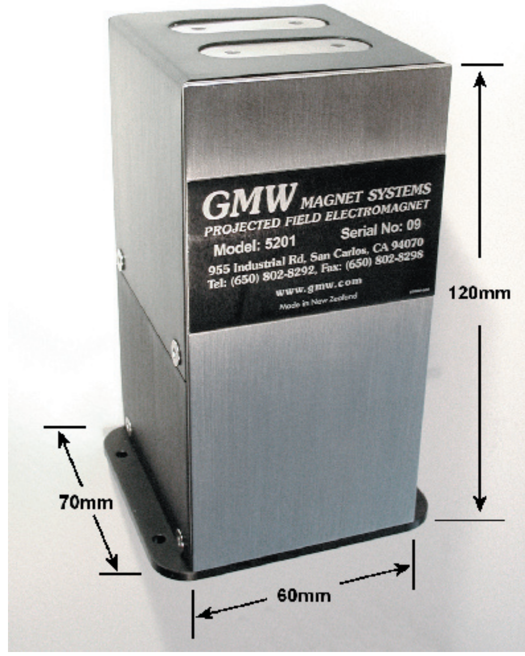
15 March 2005

By "projecting" magnetic field outside the Model 5201 Electromagnet, a volume of approximately uniform magnetic flux density is made available for magnetic measurements on small samples. Open access to the sample surface is available for diagnostic probes and radiation from laser and synchrotron radiation sources.

The Bx component of the field is uniform to ±1% in a planar, thin volume of 2 x 10 x 0.2mm (x, y, z) which is particularly appropriate for studies of in-plane effects in planar samples oriented parallel to the Electromagnet surface.

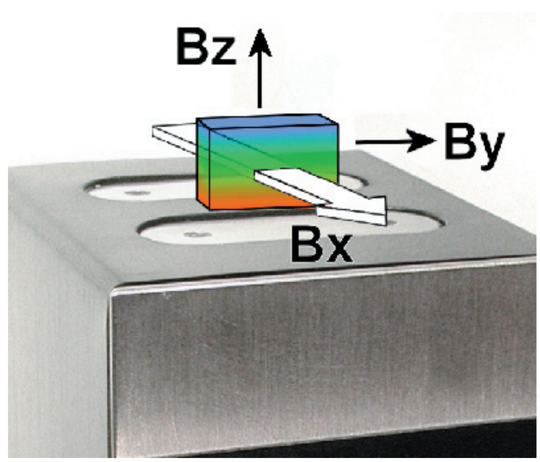
Bx can be computer or manually controlled over the range of ±0.4T (4000G) at z = 2mm from the Electromagnet surface, decreasing to a range of ±0.1T(1000G) at z = 12mm.

Small size and low weight enable the 5201 to be mounted in any orientation on standard transverse and rotary motion stages for accurate control of the projected field in position and angle with respect to the sample. The 5201 projected field can be introduced into a vacuum chamber or cryostat via a reentrant tube of 100mm (3.9inch) inside diameter and an appropriate non-magnetic window.



Applications:

- Development and quality control measurements of in-plane magnetic field effects in magnetic thin films, magnetic media and magnetic devices such as FeRAM and MRAM. The open geometry reduces the difficulties of access to the sample surface for radiation beams for MOKE (Magneto-Optic Kerr Effect) and SMOKE (Surface MOKE).



- Scanning Probe Microscopy utilizing Scanning Electron Microscopy with Polarization Analysis (SEMPA), Scanning Tunneling Microscopes (STM) or Atomic Force Microscopes (AFM) is more easily implemented by the open access to the sample surface.

- Calibration and test cycle times for Hall effect, MR (Magneto Resistive) and GMR (Giant MR) magnetic field sensors can be reduced by simplified robotics for device handling and faster control of field magnitude and direction.

- Chemical reaction rates and biological sample activity in magnetic fields may be more readily be monitored because of the improved access for elecrical and optical probes.

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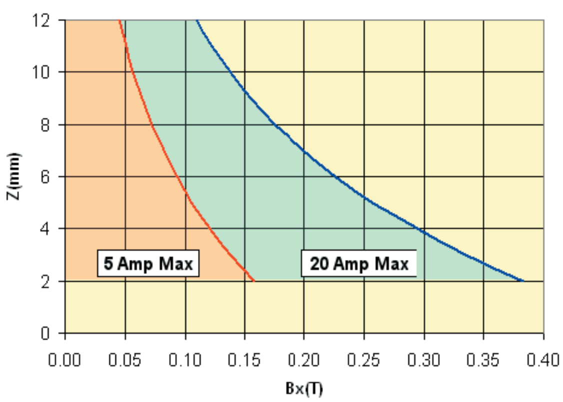
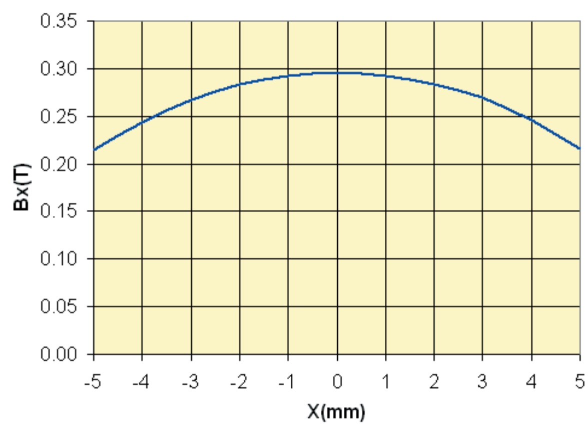
Specifications: **15 March, 2005**

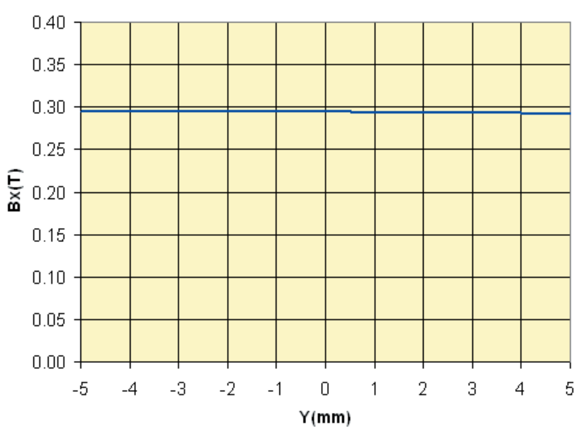
General	
Field Uniform Volume (± 1%) for Bx	x=0 ±1mm, y=0 ±5mm, dz=±0.1mm for z>1mm
Field Operating Range for Bx	±0.4T (4kG) at 0, 0, 2mm. ±0.1T (1kG) at 0, 0, 12mm
Dimensions	70 x 60 x 120mm (x, y, z) (2.8 x 2.4 x 4.7”)
Weight	2.1kg (4.6lbs)
Coils (Series Connected)	
Resistance (20ºC)	0.85Ω
Maximum Power (Air Cooled)	±5A, ±5V (25W)
Maximum Power (Water Cooled)	±20A, ±20V (400W)
Self Inductance	20mH
Water Cooling (20ºC)	0.5 liters/min, 1.0 bar (0.13 US GPM, 15 psid)
Interlocks	
Overtemperature	Open circuit above 75ºC coil temp.
Power Supply and Cooler	
Power Supply Input	115V, 50/60Hz, 11A Max. (Other AC inputs available)
Cooler Input	115V, 50/60Hz, 10A Max. (Other AC inputs available)



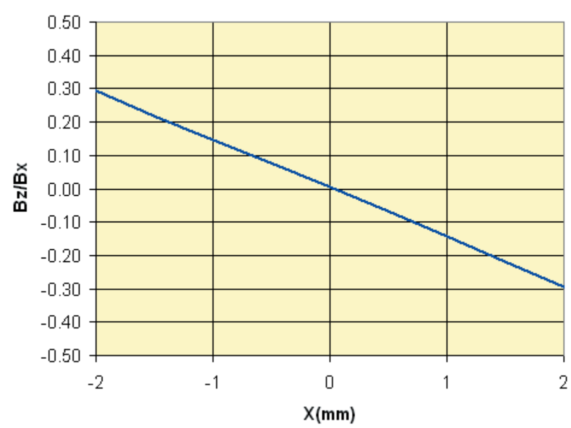
Bx vs. Z (X=Y=0mm) I=5A & 20A



Bx vs. X (y=0mm, z=4mm) I=20A



Bx vs. Y (X=0mm, Z=4mm) I=5A & 20A



Bz/Bx vs. X (y=0mm, z=4mm) I=20A

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