

TECHNOLOGICAL OFFER - CELLS

A NEW BENCH CONCEPT FOR MEASURING MAGNETIC FIELDS OF BIG CLOSED STRUCTURE

Researchers of ALBA synchrotron have developed a new magnetic measurements bench with new capacities compared with the current technology present in the market.

The measurement of big closed magnetic structures is becoming a challenge of great interest. The main reason is the tendency towards building accelerators with high magnetic fields produced by small gap magnets, as well as the development of cryogenic or superconducting narrow-gap insertion devices or whatever magnetic array or ID enclosed in the vacuum chamber and only accessible through their edges. Usual approach, based on side-measurements made with a Hall probe mounted on the tip of a motorized arm based on a long granite bench is no more applicable to such closed structures. So, new concepts and approaches are being used, mainly based on complex devices that insert a Hall probe inside the magnetic structure with position only monitored or controlled via complex control loops, but they cannot make 2D fieldmaps, only lineal scans. **Researchers of ALBA synchrotron have developed a new bench that is simple, multi-purpose and can be a general solution for measuring big closed structures.** The bench design and prototype is presented in figure 1.

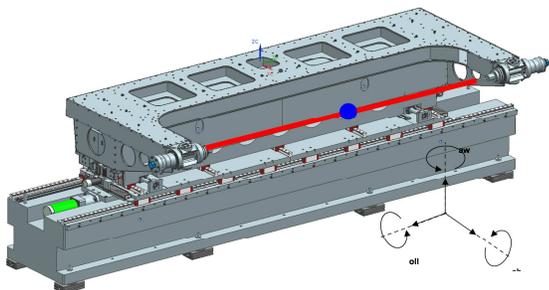


Figure 1: Design and picture of the new Hall probe bench prototype built at CELLS.

In this design, the tape material is carbon fiber, and in operation mode a stretching force of 5000 N is applied to maintain the frequency of vibration modes far from low frequencies. The ends of the tape are attached to a structure shaped in "C" through a mechanism allowing the horizontal alignment of the Hall probe as well as the stretching of the tape. The "C" structure is designed to allow a tension up to 20000 N, if needed, to shift the tape vibration modes at convenience. **It can measure a volume of 1.2 m long, 0.5 m wide and 0.25 m high with a global accuracy of positioning of $\sim 20 \mu\text{m}$ / $35 \mu\text{rad}$, and repeatability of probe positioning of $\sim 1 \mu\text{m}$.**

With this new development ALBA offers an accurate magnetic measurements bench to measure magnetic fieldmaps of big closed magnetic structures adopting an original concept.

CELLS (ALBA Synchrotron) is the owner of the present invention and is offering it to the technological industries for its commercialization. Those companies interested, please, do not hesitate to contact the ALBA Industrial Liaison Office in the below email:

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