

## Internal directive Ma-2-2015: Static magnetic fields

The human body cannot directly detect magnetic field; the reason why the former is often dreaded or misunderstood. The most important hazards of intense static magnetic fields are:

- Thermal effect felt by the human body.
- Discomfort caused by the intensity of the field (perturbation of sight, taste damage).
- Pulling of ferromagnetic objects that become missiles.
- Other assumed long-term effects still misunderstood by the medical practitioners.

To reassure and protect the staff, it is useful to mark different areas of magnetic flux density on the floor. Based on the cartography of the magnetic flux density around the instrument producing magnetic field, three zones are defined. They are marked on the floor by tapes of different colors (see picture right hand side), which represent the access thresholds for the public and the staff that is professionally exposed.

Furthermore, **pregnant women** should not be exposed to magnetic flux densities of more than **40 mT** (8 hours per day/ 42 hours per week, over long periods). This occupational exposure limit was introduced by the *Ordonnance sur la protection de la maternité*, 822.111.52 and entered into force as from July 1<sup>st</sup> 2015).



0.2 T (2k G)



3mT (30 G)



0.5 mT (5 G)

Magnetic flux density	Description of the limit/ restriction	Entrance forbidden to
0.5 mT (5 G)	Maximal magnetic flux density authorized for public and pacemaker wearers.	- Public - Pacemaker wearers - Non-authorized people
3 mT (30 G)	Value starting from which the field can drag ferromagnetic objects.	- Any ferromagnetic object
0.2 T (2 kG)	8 hours per day/5 days a week occupational exposure limit. Value starting from which the access is unauthorized without medical recommendation.	- Any, excepted with medical recommendation

**Units Reminders:** the Tesla [T] = [Vs/m<sup>2</sup>] is the unit for magnetic flux density. The old unit is the Gauss (G) with 1 G = 100  $\mu$ T. The most powerful NMR spectrometer of the ISIC (800 MHz) generates 18.8 T magnetic field. The most powerful instrument RMI of the CIBM generates a field of 14.1 T.