COMMENT

A hole in the LHC's vacuum bubble safety argument

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Abstract. This comment points out an important gap in the argument excluding the risk of vacuum bubble formation at the LHC.

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One of the four specific risks considered in the most recent official safety review for the Large Hadron Collider (LHC) is the possibility that LHC collisions could trigger a transition to a lower-energy vacuum state. The current review by the LHC Safety Assessment Group (LSAG) [2] asserts that this risk was ruled out in the earlier report of the LHC Safety Study Group (LSSG) [1]. The conclusion of the LSAG's report states:

> "In the case of phenomena, such as vacuum bubble formation via phase transitions or the production of magnetic monopoles, which had already been excluded by the previous report [1], no subsequent development has put these firm conclusions into question."

It should be noted, however, that the LSSG's report considers only the three specific risks of strangelets, black holes, and magnetic monopoles. The LSSG's report includes no mention whatsoever of the possibility of vacuum bubble formation and includes no data relevant to the vacuum bubble safety argument briefly outlined in the LSAG's report.

References

[1] Blaizot J P *et al* (LSSG) 2003 *Report of the LHC Safety Study Group* CERN-2003-001 (http://cdsweb.cern.ch/record/613175/files/CERN-2003-001.pdf)

[2] Ellis J *et al* (LSAG) 2008 *J. Phys. G: Nucl. Part. Phys.* **35** 115004 (arXiv:0806.3414 [hep-ph])