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TOPOLOGY SEMINAR SS 2020
(Prof. Banagl, with Ghaed Sharaf)

TORSION AND SIMPLE HOMOTOPY EQUIVALENCES

We meet Thursdays 2–4pm in Prof. Banagl's Webex-room (URL below). The first meeting is on Th. April 23, 2pm ct. Every participant will prepare electronic presentation slides before the talk. We find that LaTeX with the "beamer" document class works very well for this, but you are free to choose whichever software you prefer. The presenter will then give their talk using Webex desktop sharing with audio narration. If you have a tablet, you may also use the tablet's whiteboard, One Note, etc., but do make sure that your presentation can be exported as a file so that we are able to collect these files and make them available to participants after the Webex talk.

Registration by email to Shahryar Ghaed Sharaf, `ssharaf@mathi.uni-heidelberg.de`, is required. Your email must contain name, matriculation number, and the desired talk. The schedule and available topics of talks can found on

`https://www.mathi.uni-heidelberg.de/∼ssharaf/Seminar220.html`

Scientific Info: In dimensions $0, 1, 2$, the homotopy type of a closed manifold determines its homeomorphism type. In higher dimensions, homotopy equivalences between closed manifolds are much harder to understand, particularly if the fundamental group is not trivial. Indeed, there are closed manifolds that are homotopy equivalent but not homeomorphic. Historically the first such examples were 3-dimensional lens spaces, whose classification used the concept of (Reidemeister) torsion. More generally, J. H. C. Whitehead assigned torsion to any homotopy equivalence. A homotopy equivalence is called *simple* if its torsion vanishes. For example, homeomorphisms are simple and if the manifolds are simply connected, then any homotopy equivalence between them is simple. The seminar language is English.

Prerequisites: Some algebraic topology.

Literature:
Marshall M. Cohen, *A Course in Simple Homotopy Theory*, GTM 10, Springer, 1973.

Office Hours:
Prof. Banagl, Th. 1-2pm, `https://uni-heidelberg.webex.com/meet/banagl`
Ghaed-Sharaf, We. 12-1pm, `https://uni-heidelberg.webex.com/meet/ghaed`