topics on low dimensional topology

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Related topic	Topology

List of topic on low dimensional topology that should be here at PM

1 Manifolds in general

- manifold
- homotopy, homotopy groups,
- isotopy, mapping class group, homeotopy
- homology and cohomology
- fiber bundle, characteristic classes
- piecewise linear topology
- topological methods in group theory
- CW complex

2 1-manifolds

- real line vs projective line
- circle from a Euclidean loop to a Lie group
- curve
- knot, link and Jones polynomial. Prime knots
- torus knots
- braid
- loop and string, Witten M-Theory
- fundamental group
- graph and graph theory

3   2-manifolds

- Mobius strip

- surface

- two sphere

- torus

- projective plane

- Klein bottle

- genus (genus of topological surface)

- Euler characteristic (Euler's polyhedron formula)

- Gaussian curvature

- Nielsen-Thurston classification of surface homeomorphisms

4   3-manifolds

- $\mathbb{R}^3$ Euclidean three-space

- S^3 three sphere, $SO(3)$, $SU(2)$

- surface bundle

- circle bundle, lens space, `http://planetmath.org/SeifertFiberSpace`Seifert fiber space

- homology sphere

- Poincare conjecture

- Dehn's lemma, loop theorem, sphere theorem

- annulus and torus theorems

- Hopf bundle

5 4-manifolds

- Donalson's theory

- quaternions

- relativity, space-time

- surface bundles over surfaces

- spin structures

- there are homeomorphic four-manifolds with differentiable structures each, which make them non-diffeomorphic.

- gauge theory: monopoles

- classification of simply connected 4-manifolds

- intersection form

- geometrization

6 Mathematical physics