Homotopy groups of embedding spaces

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Embeddings of manifolds are well studied. Perhaps the most well known are knots, which are embeddings of the circle in a 3-manifold. However, instead of studying individual embeddings, we could study the space of all embeddings $Emb(N, M)$ which captures more information. For instance, embedded torii in a 4-manifold M can be seen as a loop in $Emb(S^1, M)$.

In recent work, Budney and Gabai construct "knotted balls" in 4-manifolds as coming from elements of π_2 of the space of embedded arcs with fixed boundary. In this talk, I will discuss my work on understanding π_3 of the space of embedded arcs (with fixed boundary) in $S^1 \times B^3$.