Abstract: In the theory of loop spaces, an interesting question is how to characterize geometric objects (say, functions and line bundles) on the loop space of a manifold which are related by transgression to objects one topological degree higher (say, line bundles and gerbes respectively) on the manifold itself. The property of ‘fusion’, first introduced by Stolz and Teichner and further developed by Waldorf, plays a key role.

While there are known results for low topological degree making use of fusion and various equivariance conditions, these become increasingly difficult to extend to higher degrees. I will present a joint result with Richard Melrose which solves the problem at the level of Čech cohomology in all degrees. Specifically, we produce a refinement of Čech cohomology for the continuous loop space in terms of fusion and a second ‘figure-of-eight’ condition, through which transgression from the cohomology of the base factors as an isomorphism.

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