Representations of groups of flows were systematically studied by Gel’fand, Graev and Vershik in the early 1970’s.

In the present paper, the authors consider the smooth case. For a compact Riemannian manifold $M$ without boundary, with dimension at least one and a compact connected Lie group $G$, they introduce the “gauge group” $\mathcal{G}$ of all smooth mappings of $M$ into $G$.

The “energy representation” $W$ of the “gauge group” is a specific unitary action on some extension of the Hilbert space $H$ of all square integrable, $g$-valued 1-forms on $M$, where $g$ is the Lie algebra of $G$. It plays an important role in quantum field theory.

The main result of this paper claims that the energy representation $W$ has no nonzero fixed vectors. In some cases (the dimension of $M$ is greater than 1) this result follows from the irreducibility of $W$ proved by Ismagilov, Gel’fand-Graev-Vershik, Albeverio-Hoegh-Krohn-Testard, or Wallach. The proof given in the paper under review applies in the general situation.

The method developed by the authors uses the Gaussian regular representation of the Euclidean group of a real separable Hilbert space.

{For the entire collection see MR 2001f:00037}