1016-37-16 **Marian Gidea*** (mgidea@neiu.edu), Department of Mathematics, Northeastern Illinois University, 5500 N St Louis Ave, Chicago, IL 60625, and **Rafael de la Llave** (llave@math.utexas.edu), University of Texas at Austin. *Arnold diffusion with optimal time in the large gap problem.* Preliminary report.

We present a topological mechanism for diffusion in the large gap problem for a Hamiltonian system on $\mathbb{R}^n \times \mathbb{T}^n \times \mathbb{R} \times \mathbb{T} \times \mathbb{T}$, given by $\sum_{i=1}^n \pm \left(\frac{1}{2}p_i^2 + V(q_i)\right) + H_0(I) + \varepsilon h(p_1, \ldots, p_n, q_1, \ldots, q_n, I, \phi, t; \varepsilon)$, where $V_i$ have unique non-degenerate global maxima and $\partial^2 H_0 / \partial I^2 > \delta$ for some $\delta > 0$.

We show that if $h$ satisfies some explicit non-degeneracy conditions, which are $C^2$-open and $C^\infty$-dense, then there exit trajectories for which $|I(T) - I(0)| \geq O(1)$ with $T \leq O((1/\varepsilon)\ln(1/\varepsilon))$. There are known upper bounds for $|I(T) - I(0)|$ which show that this time $T$ is optimal.

The proof is based on the theory of normally hyperbolic manifolds and the method of correctly aligned windows. (Received December 17, 2005)