1035-60-1667 **Cranston C Michael*** (mcransto@math.uci.edu), Department of Mathematics, University of California, Irvine, Irvine, CA 92697, and **Stanislav Molchanov** (smolchan@uncc.edu), Department of Mathematics and St, UNC-Charlotte,Fretwell 355G, 9201 University City Blvd., Charlotte, NC 28223-0001. *Phase Transitions and Limit Reults for Homopolymers.*

Given the measure on continuous time, simple symmetric random walk paths $\mathbf{P}$ on $\mathbf{Z^d}$ and a Hamiltonian H, the Gibbs perturbation of H defined by

$$\frac{d\mathbf{P}_{\beta,t}}{d\mathbf{P}} = Z_{\beta,t}^{-1} \exp\{-\beta H(t,x)\}$$

with

$$Z_{\beta,t} = \int \exp\{-\beta H(t,x)\} \, d\mathbf{P}(x)$$

gives a new measure on paths x which can be viewed as polymers. In the case $H(t,x) = -\int_0^t \delta_0(x_s)ds$ we say the resulting measure is concentrated on "homopolymers" and we investigate the influence of dimension and β on their behavior. We find there is a phase transition at a critical parameter value β_{cr} from an analysis of the spectrum of the operator $\Delta + \beta\delta_0$. For values of $\beta > \beta_{cr}$ the homopolymers are in a so-called globuar phase and do not go far from the origin. For values of $\beta < \beta_{cr}$ the homopolymers are in a so-called diffusive phase and satisfy a central limit theorem when properly normalized. The behavior at $\beta = \beta_{cr}$ depends on dimension and is globular in high enough dimension but diffusive in low dimensions. (Received September 20, 2007)