1047-05-266 **Bela Csaba*** (bela.csaba@wku.edu), Dept. of Mathematics, 1906 College Heights Blvd., Bowling Green, KY 42101, **Ali Shokoufandeh** (ashokouf@cs.drexel.edu), Department of Computer Science, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, and **Jeff Abrahamson** (jeffa@cs.drexel.edu), Dept. of Computer Science, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104. *Optimal Random Matchings on Trees and Applications.*

We consider tight upper- and lower-bounds on the expected total length of the optimal matching between two random point sets distributed among the leaves of a hierarchically separated tree. Specifically, given two n element sets of points $R = \{r_1, ..., r_n\}$ and $B = \{b_1, ..., b_n\}$ distributed uniformly and randomly on the m leaves of a λ-Hierarchically Separated Tree with branching factor b such that each one of its leaves are of depth δ, we prove that the expected total length of the optimal matching between R and B is $\Theta(\sqrt{nb}\sum_{k=1}^{h}(\sqrt{b}\lambda)^k)$, for $h = \min(\delta, \log_b n)$. This result allows us to provide bounds on the expected total length on other metric spaces via approximate embeddings into hierarchically separated trees. In particular, we reproduce the results concerning the expected optimal transportation cost in $[0,1]^d$ (except for $d = 2$) and prove bounds on self-similar sets, e.g., the Cantor set, and various fractals. (Received January 30, 2009)