Meeting: 1002, Pittsburgh, Pennsylvania, SS 2A, Special Session on Convexity and Combinatorics

1002-52-193 **Gábor Fejes Tóth*** (gfejes@renyi.hu), P.O.Box 127, 1364 Budapest, Hungary. *Covering with Fat Convex Discs.*

According to a theorem of L. Fejes Tóth, if non-crossing congruent copies of a convex disc K cover a convex hexagon H, then the density of the discs relative to H is at least area $K/f_K(6)$ where $f_K(6)$ denotes the maximum area of a hexagon contained in K. Two convex discs *cross* if removing their intersection from them each disc becomes non-connected. The assumption that the discs do not cross seems to be superfluous and it has been an open problem for over 50 years to get rid of this assumption. We say that a convex disc K is r*-fat* if it is contained in a unit circle C and contains a concentric circle c of radius r. Recently, Heppes showed that the above inequality holds without the non-crossing assumption if K is an 0.8561-fat ellipse. We show that the non-crossing assumption can be omitted if K is an r_0-fat convex disc with $r_0 = 0.933$ or an r_1-fat ellipse with $r_1 = 0.741$. (Received September 14, 2004)