Meeting: 1003, Atlanta, Georgia, SS 24A, AMS Special Session on Design Theory and Graph Theory, I

1003-05-472 **Nick Cavenagh** and **Abdollah Khodkar*** (akhodkar@westga.edu), Department of Mathematics, State University of West Georgia, Carrollton, GA 30117, and **Saad El-Zanati** and **Charles Vanden Eynden**. *On a generalization of the Oberwolfach Problem.*

One of the best-known problems on factorizations into cycles is the Oberwolfach problem, which was first formulated by Ringel and concerns possible seating arrangements as discussed at a graph theory conference in Oberwolfach, Germany in 1967. The question is if it is possible to seat an odd number m of people at t round tables at which there are $a_1, a_2, \ldots, a_t$ seats (with $a_1 + a_2 + \ldots + a_t = m$ and $a_i \geq 3$) on $(m-1)/2$ days so that each person sits next to every other person exactly once. Thus the Oberwolfach problem asks for a 2-factorization of the complete graph K_m in which each 2-factor consists of cycles of lengths $a_1, a_2, \ldots, a_t$.

In this talk, we study the case $m = p^n$, where p is an odd prime. Clearly, if K_{p^n} has a C_t-factor, then t must also be a power of p, say $t = p^k$ with $1 \leq k \leq n$. In particular, we show that if $e_1, e_2, \ldots, e_n$ is a sequence of nonnegative integers such that the first non-zero term is not one and $\sum_{i=1}^{n} e_i = (p^n - 1)/2$, then the complete graph K_{p^n} can be decomposed into e_1 C_{p^n}-factors, e_2 $C_{p^{n-1}}$-factors, ..., and e_n C_p-factors. (Received September 15, 2004)