Meeting: 1005, Newark, Delaware, SS 2A, Special Session on Singular Analysis and Spectral Theory of Partial Differential Equations

1005-35-152 **Ingo Witt*** (i.witt@imperial.ac.uk), Department of Mathematics, Imperial College London, 180 Queen's Gate, SW7 2AZ London, England. *Solvability for a class of semilinear elliptic Fuchsian PDEs.* Preliminary report.

We discuss solvability for semilinear elliptic equations of the form

$$Au = F(x, B_1u, \ldots, B_Ku) \text{ in } X \setminus \partial X, \quad Tu = g \text{ on } \partial X,$$

for a differential operator A that is Fuchsian with respect to ∂X, for a C^∞ compact manifold X, and that together with the boundary condition $Tu = 0$ is supposed to be positive definite selfadjoint in the weighted L^2 space $H^{0,\delta}(X)$, for some $\delta \in \mathbb{R}$. The Fuchsian differential operators $B_1, \ldots, B_K$ are of orders strictly less the order of A, and the nonlinearity $F = F(x, \nu)$ is of at most polynomial growth in ν. Moreover, the linear surjective boundary map $T\colon D_+ \to \mathbb{R}^\mu$ factors through D_+/D_-, where D_+ and D_- are the maximal and minimal domains of A in $H^{0,\delta}(X)$, respectively; $\dim D_+/D_- = 2\mu$.

As solutions to the above problem are unbounded in general, the main step consists in an *a priori* description of the asymptotics of these solutions $u = u(x)$ as $x \to \partial X$. (Received February 07, 2005)