Title: Slaying Monsters

Abstract: Black hole entropy remains a deep puzzle: where does such enormous amount of entropy come from? Curiously, there exist gravitational configurations that possess even larger entropy than a black hole of the same mass, in fact, arbitrarily high entropy. These are the so-called monsters, which are problematic to the Anti-de Sitter/Conformal Field Theory (AdS/CFT) correspondence paradigm since there is far insufficient degrees of freedom on the field theory side to account for the enormous entropy of monsters in AdS bulk. The physics of the bulk however may be considerably modified at semi-classical level due to the presence of branes. We show that this is especially so since monster spacetimes are unstable due to brane nucleation. As a consequence, it is not clear what the final fate of monsters is. We argue that in some cases there is no real threat from monsters since although they are solutions to Einstein’s Field Equations, they are very likely to be completely unstable when embedded in string theory, and thus probably are not solutions to the full quantum theory of gravity. Our analysis, while suggestive and supportive of the claim that such pathological objects are not allowed in the final theory, by itself does not rule out all monsters. We comment on various kin of monsters such as the bag-of-gold spacetime, and also discuss briefly the implications of our work to some puzzles related to black hole entropy.