Problem Set 8, Algebraic Stacks
Lecturer: Georg Oberdieck

Due date: Friday, Jan 29. Weights: 20 points each.

Problem 1. Show that the algebraic stack $[\mathbb{A}^1/\mathbb{G}_m]$ does not have a coarse moduli space. (You may assume that you work over $\mathbb{C}$.)

Problem 2. Show that $B\mathbb{G}_m \to \operatorname{Spec}\mathbb{Z}$ is a gerbe.

Problem 3. Show that any gerbe $\mathcal{X} \to X$ over an algebraic space X is a coarse moduli space. (Hint: For start show that for a smooth affine group scheme G over a field k, $BG \to \operatorname{Spec}(k)$ is a coarse moduli space.)

Problem 4. Olsson, 11.G

Problem 5. (Optional, but looks fun) Olsson, 11.H