

Abstract Submitted  
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**Accelerated Evolution in the Death Galaxy**<sup>1</sup> ROBERT AUSTIN, Princeton University, CHIH-KUAN TUNG, University of Pittsburgh, XIU-QUING GONG, Hong Kong University Science and Technology, GUILLAUME LAMBERT, DAVID LIAO, Princeton University — We recall 4 main guiding principles of evolution: 1) instability of defections, 2) stress induced non-random mutations, 3) genetic heterogeneity, and 4) fragmented populations. Our previous preliminary experiments have been relatively simple 1-D stress experiments. We are proceeding with 2-D experiments whose design is guided by these principles. Our new experiment we have dubbed the Death Galaxy because of its use of these design principles. The “galaxy” name comes from the fact that the structure is designed as an interconnected array of micro-ecologies, these micro-ecologies are similar to the stars that comprise an astronomical galaxy, and provide the fragmented small populations. A gradient of the antibiotic Cipro is introduced across the galaxy, and we will present results which show how bacterial evolution resulting in resistance to Cipro is accelerated by the physics principles underlying the device.

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