



## MECHANICS SEMINAR

# A study on the injection of magnetic wires into cavities

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27 April 2022

Time: 16:00

Microsoft Teams - <https://tinyurl.com/semmec0221>

**Abstract.** Magnetic beads attract each other, forming chains similar to those found in wires. These chains can be structured or packaged inside cavities in different ways from those observed in the case of metallic or plastic wires. To understand under what conditions these chains might be structured when packed into cavities, we injected these chains of magnetic wires into a tilted Helle-Shaw cell and found that they spontaneously form self-similar patterns. Depending on the cell's tilt angle, two completely different situations arise; that is, above the angle of static friction the patterns resemble the stacking of a rope, and below they appear similar to a fortress seen from above. Furthermore, locally the first pattern forms a square network, while the second pattern exhibits triangular symmetry. For both patterns, the size distributions of closed areas follow power laws with different exponents. We characterize the morphological transition between the two patterns experimentally and numerically and explain the change in polarization as a competition between friction and gravity-induced buckling.