Physics Colloquium

Monday, April 3, 2017 / 428 Pupin Hall / 4:15 PM
wine and cheese following the colloquium

"Chiral symmetry breaking, emergent Higgs mechanism, and critical matter"

The upshot of extensive studies of fluctuations is that their qualitative importance is typically confined to isolated critical points of continuous transitions between phases of matter. This conventional wisdom also predicts the number of low energy Goldstone modes based on the so-called “G/H” pattern of symmetry breaking. I will discuss a class of systems, some quite well-known, that violate this standard paradigm. Namely, they exhibit a fewer than “G/H” number of low-energy modes due to an emergent Higgs mechanism. Even more spectacularly, such systems exhibit “critical” ordered phases, with universal power-law properties reminiscent of a critical point, but requiring no fine-tuning and extending throughout the ordered phase. One exciting recently discovered example is the heliconical nematic, that in addition to above phenomena also undergoes spontaneous chiral symmetry breaking.

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