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Active Colloids, a new building block for smarter materials

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Self-propelled micro-particles are intrinsically out-of-equilibrium. This renders their physics far richer than that of passive colloids while relaxing some thermodynamical constraints and give rise to the emergence of complex phenomena e.g. collective behavior, swarming... I will present a new form of self-assembly originating from non-equilibrium driving forces. When activated by light, a set of new self-propelled particles spontaneously assemble into *living crystals* which form, break, explode and reform somewhere else. We will show that this complex dynamics originates in the competition between self-propulsion of the particles attractive interactions induced respectively by osmotic and phoretic effects. The particles can moreover be steered by an external magnetic field. Light activated and steerable self propelled particles new perspectives in the design and the properties of smarter materials.