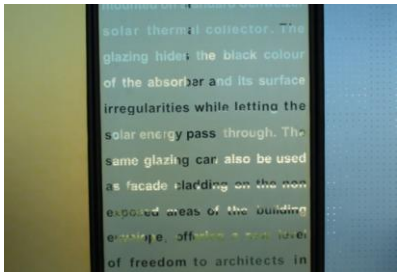
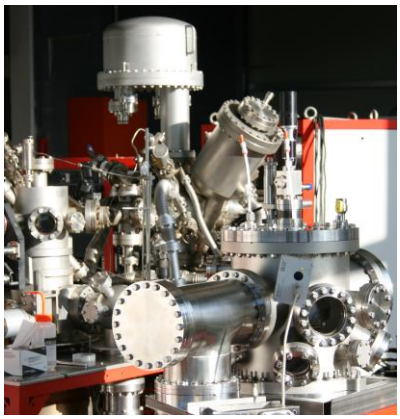
Research at LESO-PB

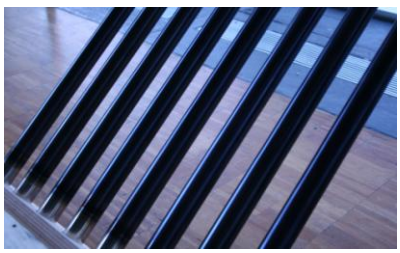
EPFL Solar Energy and Building Physics Laboratory directed by Professor Jean-Louis Scartezzini focuses on sustainability in the built environment.

- Energy efficiency in the built environment and building integrated solar energy conversion systems
- Energy savings in buildings and improvement of indoor environment quality and health through:
  - Advanced integrated day and electric lighting systems
  - Optimal and adaptive building controllers
- Urban physics and computer modeling of sustainable cities

Nanotechnology for Solar Energy Conversion at LESO-PB







Novel nano-structured materials for solar energy applications are created and characterised by the research group **Nanotechnology for Solar Energy Conversion**, led by Dr Andreas Schüler.

- **Coloured Collectors for Active Solar Façades**
  Recently developed solar collector glazing provides a unique innovative approach for a perfect architectural integration of solar thermal collectors. Multilayered thin films act as interference filters providing an aesthetic, coloured appearance while maintaining a very high solar transmittance. In spite of its excellent energetic performance, the glazing is opaque to the human eye.

  The nanocomposite layers are deposited by state-of-the-art magnetron sputtering. For investigation of the chemical and optical properties of the coatings, photoelectron spectroscopy (ESCA, XPS & UPS), ellipsometry, and spectrophotometry are used.

- **Optical Selective Absorber Coatings**
  Coatings for solar thermal absorbers must have a high energetic efficiency and be very durable under harsh operating conditions. Such so-called selective solar absorber coatings are deposited at LESO-PB by a novel low-cost sol-gel process avoiding the use of highly toxic compounds as well as the need of expensive vacuum equipment. The novel coatings show excellent stability at 400°C in air, and shall be used in flat plate and tube collectors.

Other research topics:
- Thermochromic coatings
- Architectural integration of photovoltaic panels
- Semiconductor nanocrystals for photovoltaic applications
- Structured glazing for daylighting

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ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
LABORATOIRE D'ENERGIE SOLAIRE PHYSIQUE DU BÂTIMENT

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