

Seamless photovoltaic power generation forecasting

Supervisors

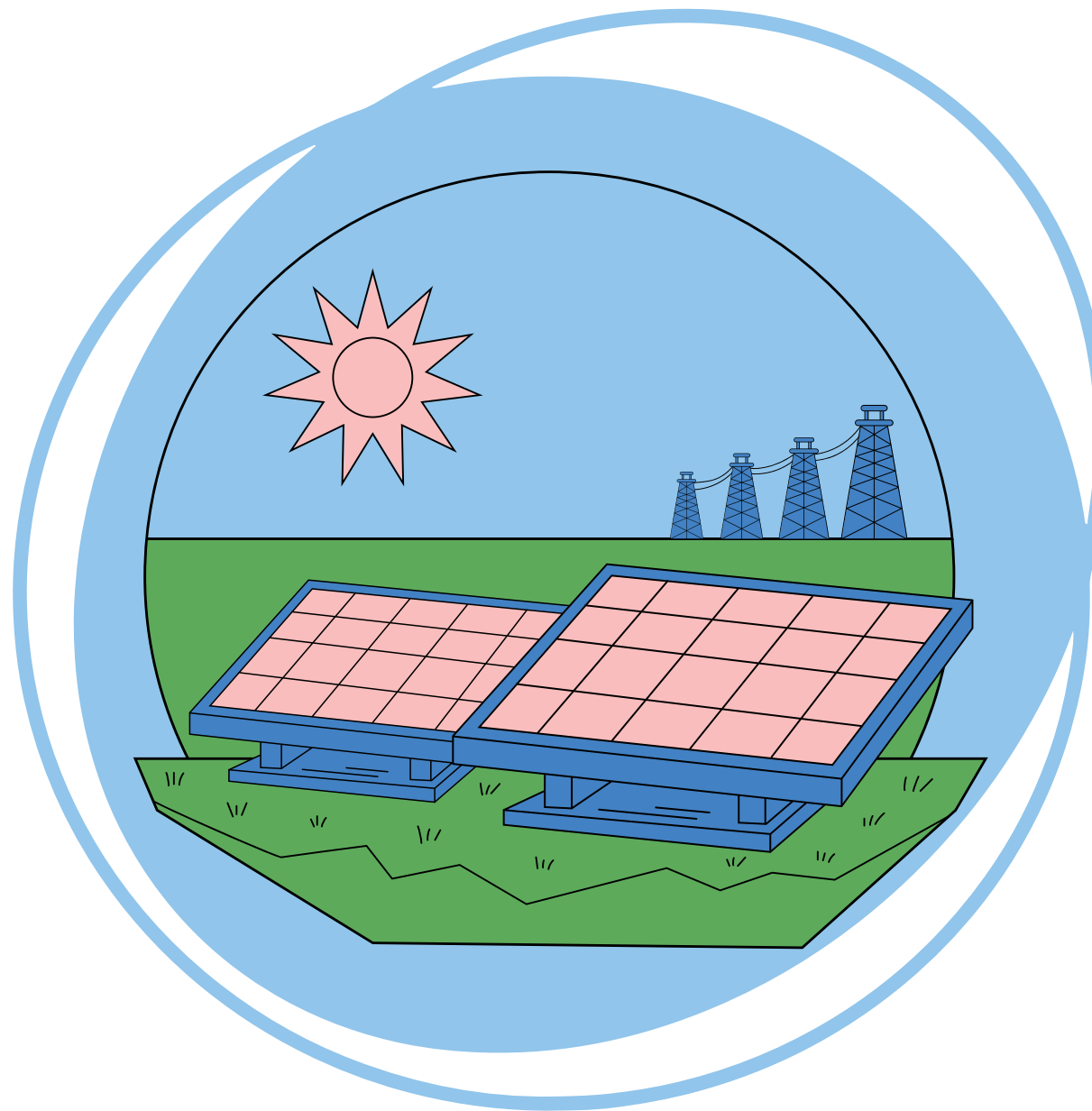
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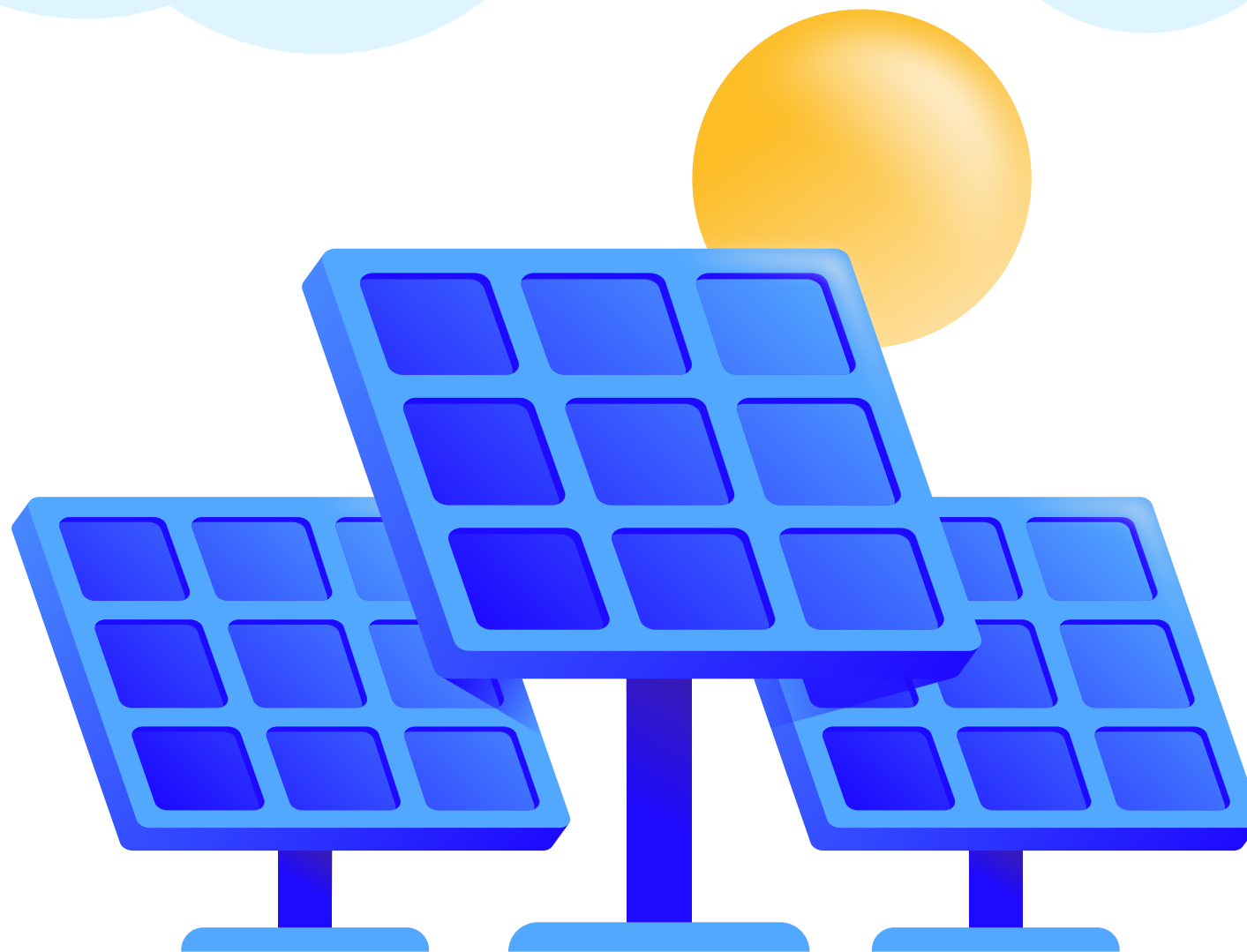
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Motivations

Greater penetration of PV installations into the grid.

Solar energy's inherent intermittency due to solar elevation and atmospheric composition.

Importance of Accurate Forecasting: reliability, safety and economic sustainability

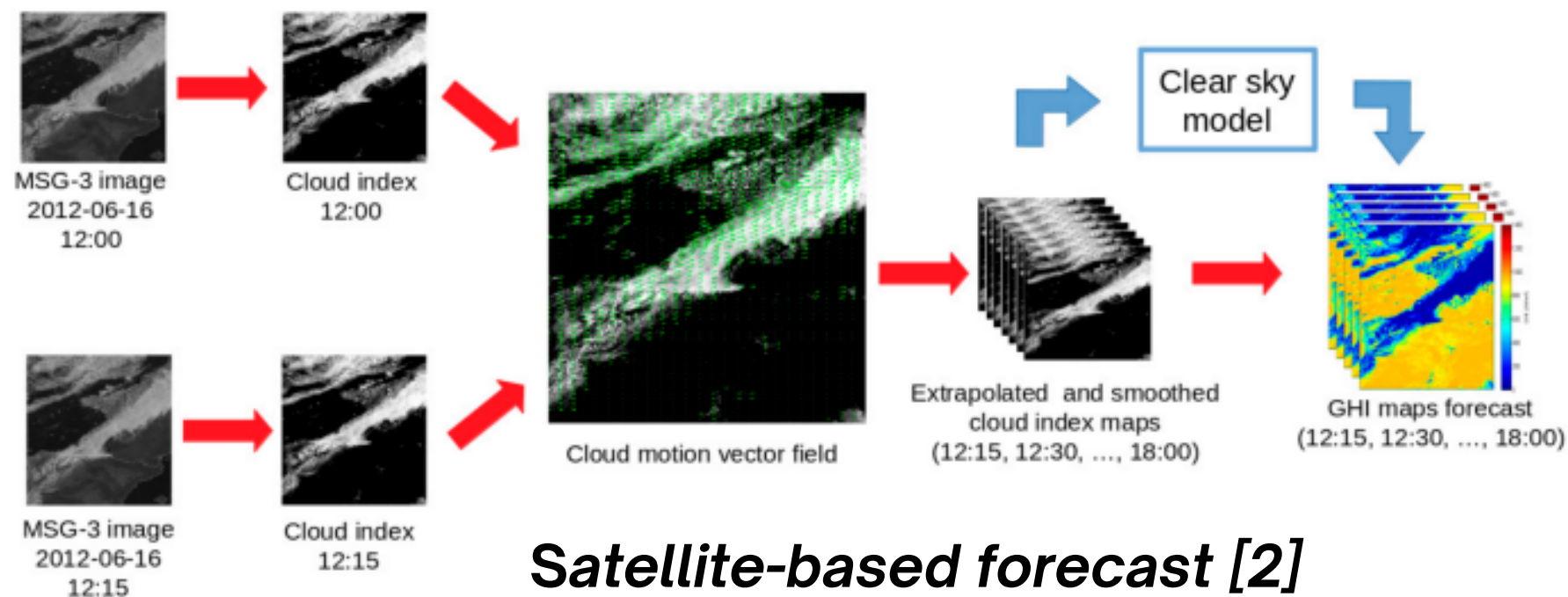


Context

Different techniques for GHI forecasting depending on the desired **time horizon**

Satellite:

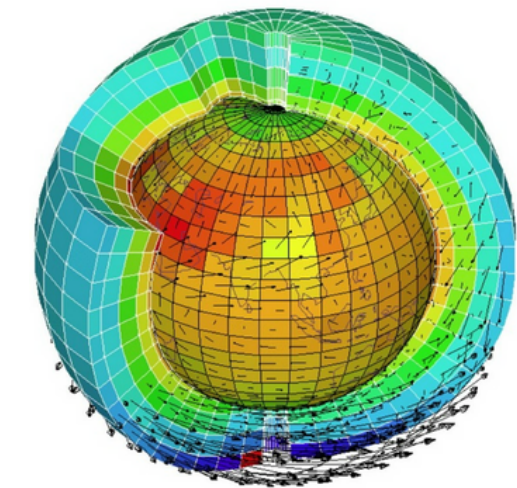
- Based on **satellite images**
- **Intra-day**: reliable up to 4-8-hour time horizon
- Time step of 15 minutes



NWP:

- Classical **meteorological models**
- **Day-ahead**

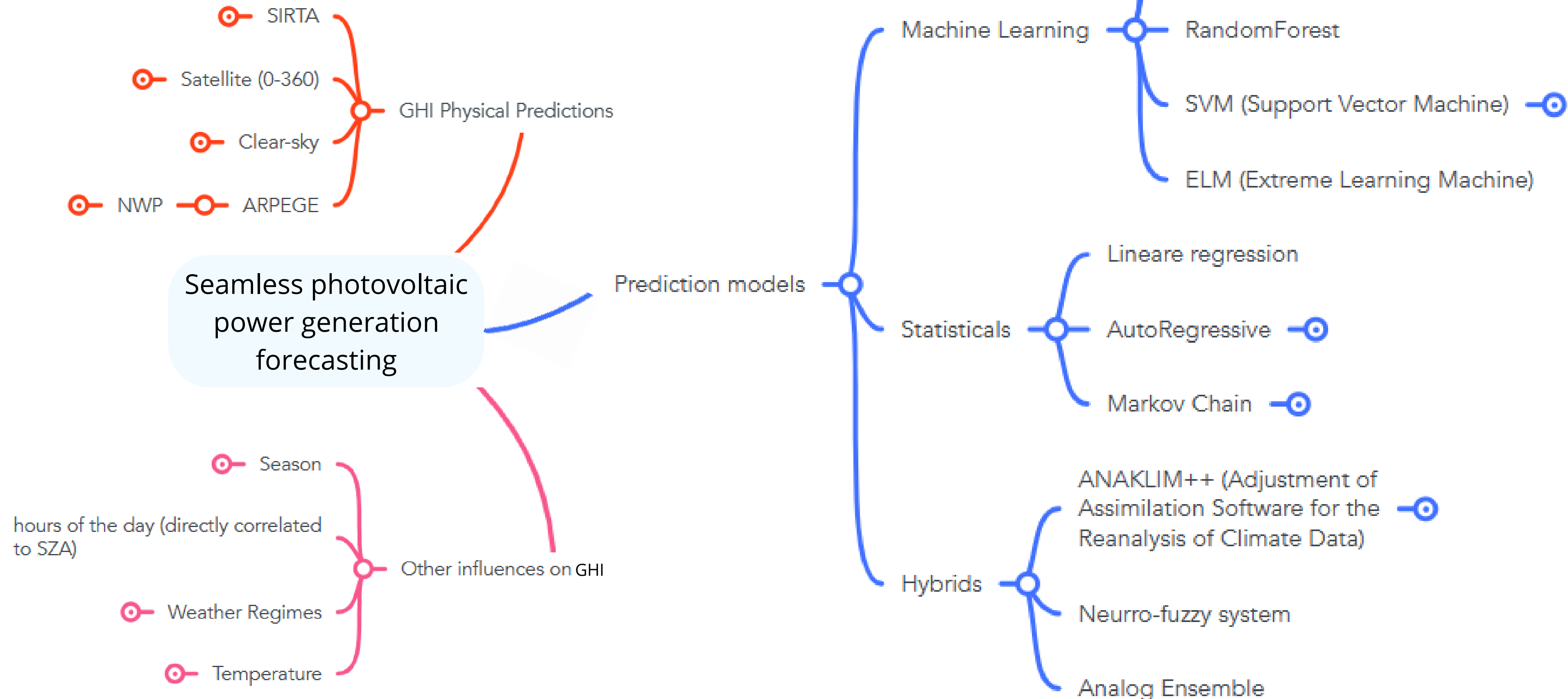
NWP model [2]



Discontinuities between time frames or in forecast values from the same horizon

Operational management of microgrids **require seamless forecasting.**

Litterature review



Objectives

1. Pv power forecast **state of the art**
2. Evaluating and programming a **linear relationship** model between satellite and weather forecasting using linear regressions of past observations [1].
3. Propose and evaluate more **advanced machine learning** methods, comparing them to the reference method.
4. Set up a finer assessment according to **parameters** influencing the errors (solar zenith angle and cloud cover).

[1] Lorenz, E., Kühnert, J., & Heinemann, D. (2012, September). Short term forecasting of solar irradiance by combining satellite data and numerical weather predictions. In *Proceedings of the 27th European PV Solar Energy Conference (EU PVSEC), Frankfurt, Germany* (Vol. 2428, p. 44014405).

Thank you
for your
attention

