Round-Table participants

University of Stavanger

Machine Learning for Physics Interpretation

Miles Cranmer
@MilesCranmer
Princeton

Matteo Favoni
@FavoniMatteo
TU Vienna

Fernando Romero-Lopez
MIT

Sebastian Wetzel
@S_J_Wetzel
Perimeter

Focus of this round-table

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ML as enabler of qualitatively new paths for physics inquiry

Identification of

- **effective d.o.f.**
- **symmetries**
- **governing equations**

from synthetic/empirical data

Setting the stage

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- Human ingenuity: identification of relevant degrees of freedom
- Symmetries restrict possible interactions
- An open challenge: physical origin of confinement

Instanton/Dyon gas

Dual superconductor

Center vortices

Multiple **competing pictures** built on insights from topology, condensed matter physics, group theory…

Opportunities for Machine Learning

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- Systematize the search for effective d.o.f.
- Exploit & build upon insight gained in the past: known order parameters as target quantity
- Exploit existing simulation data: autodiff allows to extract insights at intermediate analysis steps

Some discussion items

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Where do we stand on interpretability of machine learning approaches?

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Discovery from synthetic/empirical data: access/curation of relevant datasets?

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Discovery from synthetic/empirical data: access/curation of relevant datasets?

What elements of methodology are limiting progress for (d.o.f.) discovery?