

U.S. investment in the LHC program: time to take action

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supported by abstract submissions from

Jennifer Roloff (BNL)

Philip Ilten (Cincinnati) on event generators

Maarten Boonekamp (DAPNIA, Saclay) and Stefano Camarda (CERN) on PDFs

The nightmare scenario of particle physics?



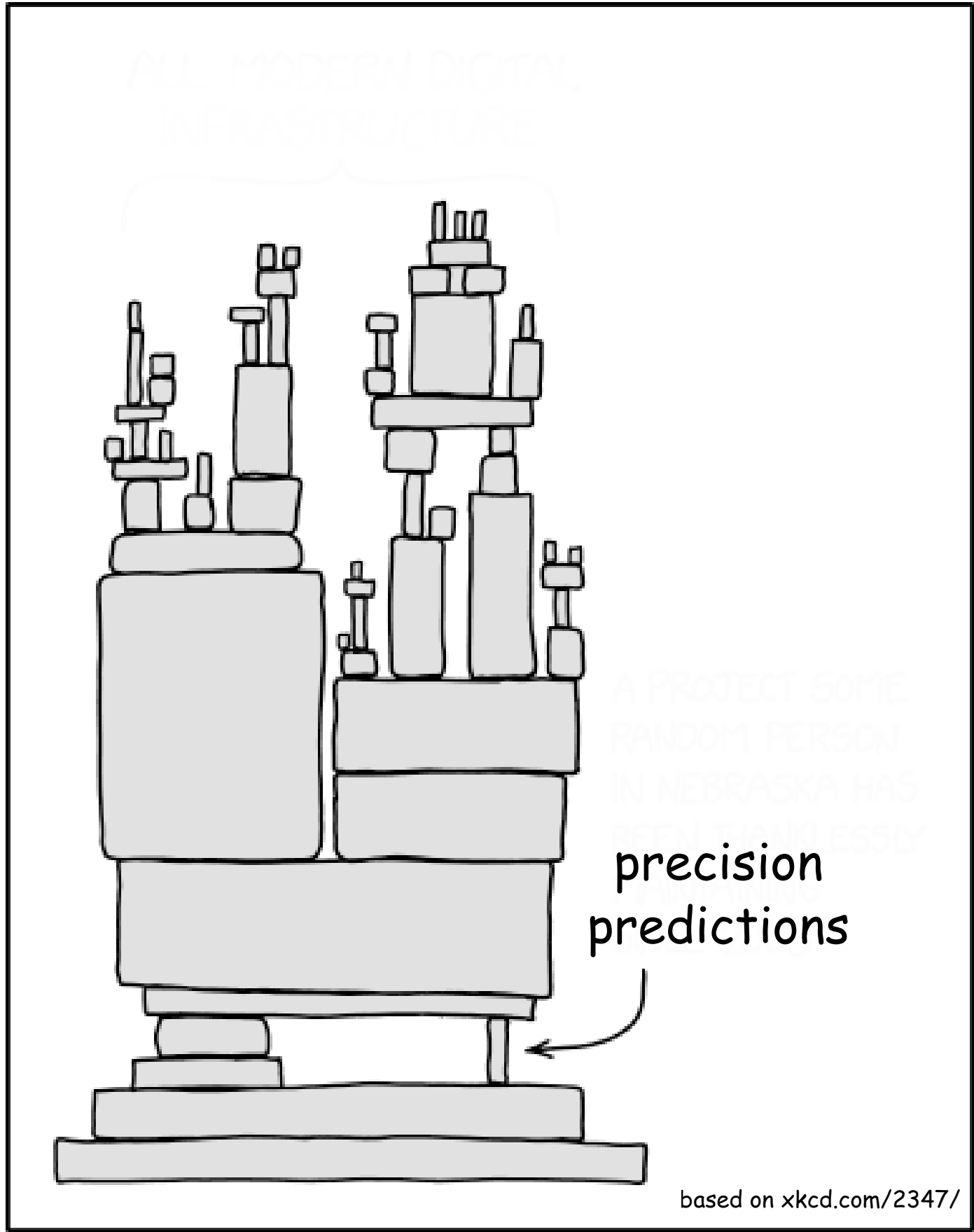
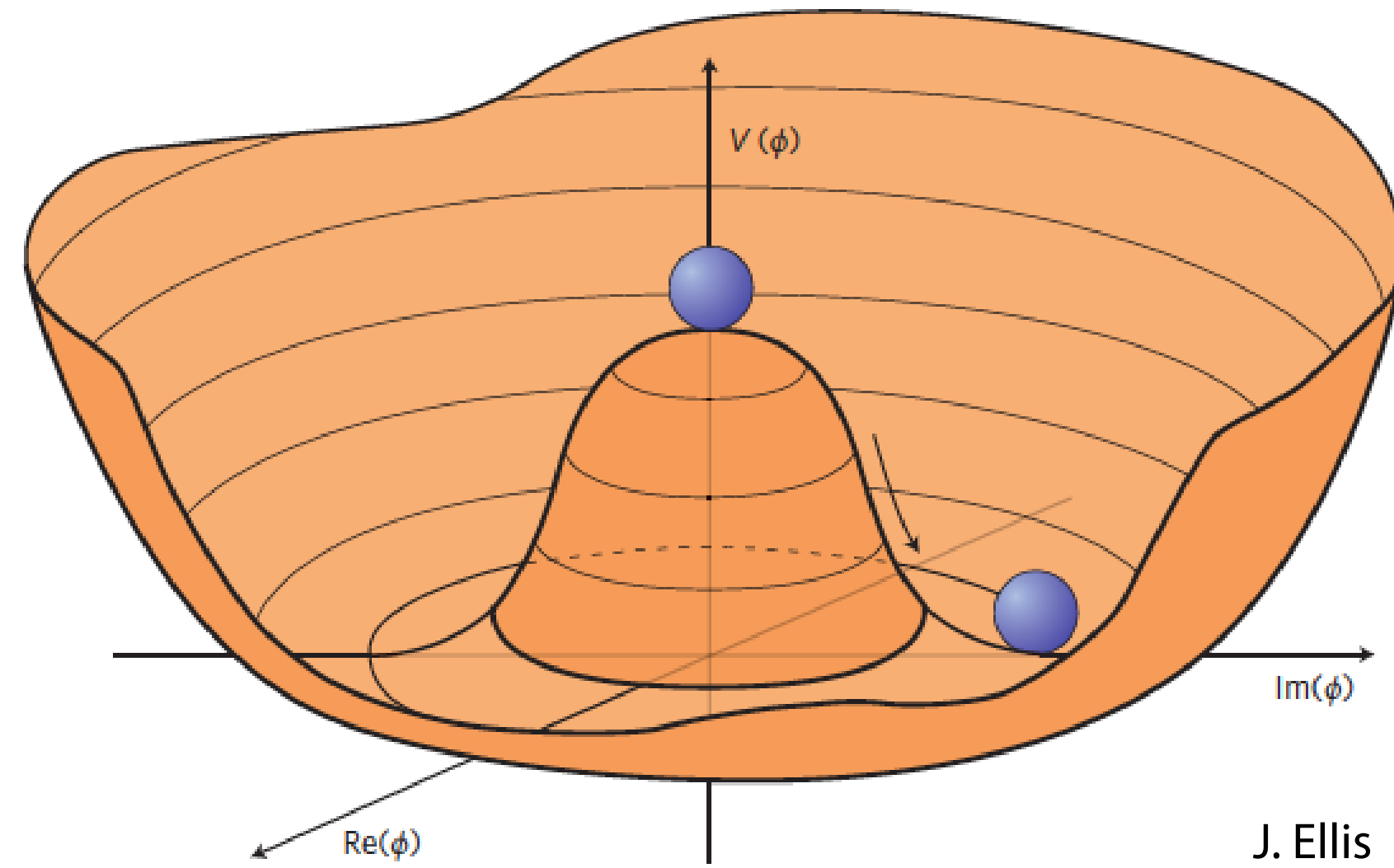




Illustration: Gaia Fontana



Theory uncertainties

- Fixed-order expansions in QCD and EW
- Higher-order resummation
- Parton showers, event generators
- Non-perturbative effects, PDFs, TMDs, ..
- Higher power/twist terms in factorization
- Understanding universality of tuning
- Numerical precision
- ...

1997: DOE/NSF/CERN treaty

**U.S. to contribute \$531 million to
CERN's Large Hadron Collider project**

8 DECEMBER, 1997

2015: +\$350M provisioned for HL-LHC

**Protocol II Between the
UNITED STATES OF AMERICA
and the EUROPEAN ORGANIZATION FOR
NUCLEAR RESEARCH**

To Agreement of May 7, 2015

+ annual upkeep (e.g. \$20M/y NSF)



LHC continues to be key for fundamental particle physics

Precision *is* discovery

Precision theory and experiment are interdependent

The U.S. investment is > \$1 BN

We need to aim to maximize the scientific benefit that taxpayers get from their investment

For this, we need strong support for precision theory