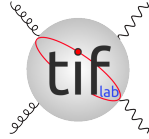


NNPDF



NNPDF
Machine Learning • PDFs • QCD

L'ANOMALIE

STEFANO FORTE
UNIVERSITÀ DI MILANO & INFN



UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI FISICA



NNPDF MEETING

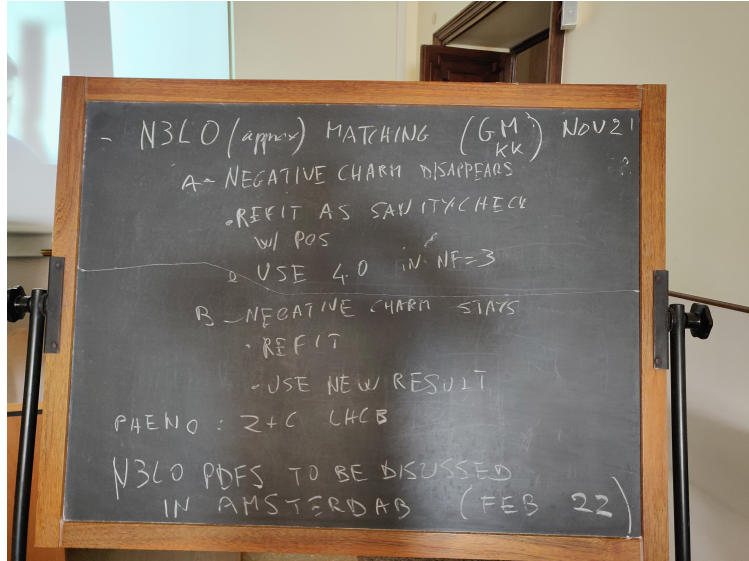
GARGNANO, AUGUST 29, 2022

OLD CHALLENGES

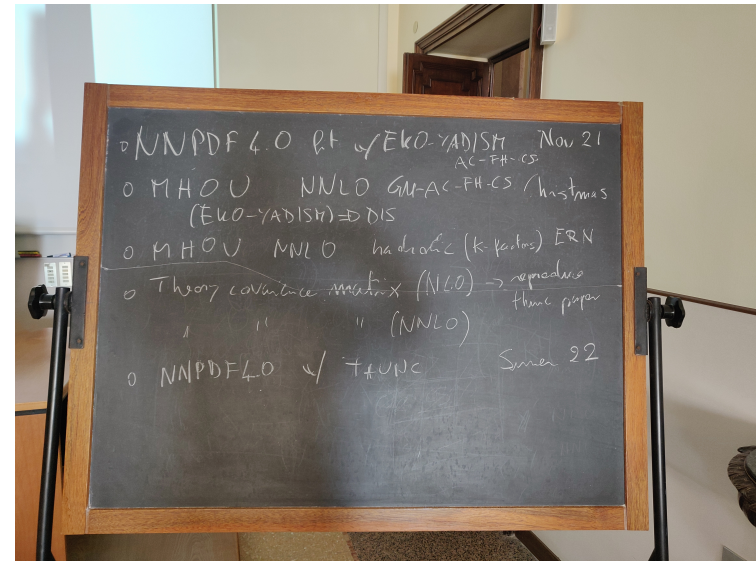
ONGOING QUESTIONS,
ONGOING ANSWERS

GARGNANO 2021

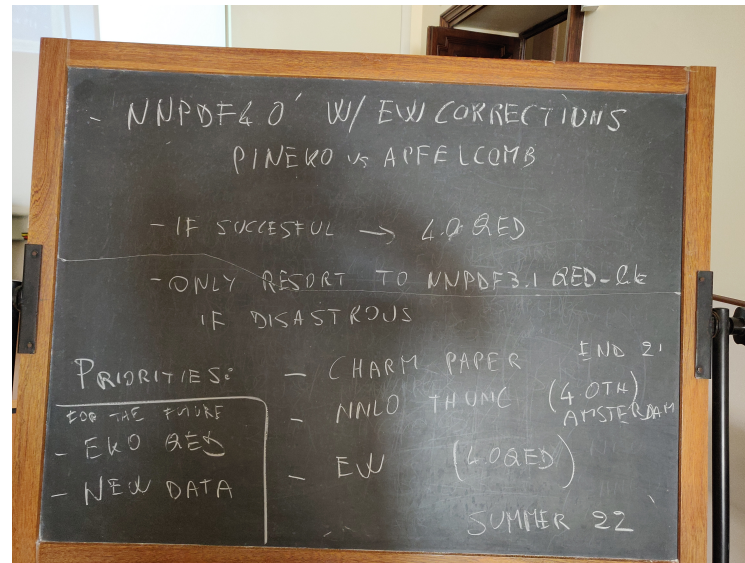
INTRINSIC CHARM



MHOU IMPLEMENTATION



EW CORRECTIONS



AMSTERDAM 2022

M H O U 4.0
QED → 4.0 QED } GARGNANO 2022
+ PAPER

FH, AC, JCM ↗ AB
CS, ERN ↘ NL

TOWARDS 4.1

- VALIDATION TOOLS
 - (ROY) OVERFITTING → IN VALID PAYS ASAP (NEXT FEB)
 - (JAMES) UNDERFITTING → AVAILABLE
 - (ZAHARI) DATA INCONSISTENCY → DIS PROCESSING
- TESTING + EXTRAP. + BIAS
 - o FEATURE SCALING
 - o EXTRAPOLATION → REGGE
 - o FT → MOVING
 - o T → → PROCESS
 - o → DISTRIBUTION

TESTS THAT FAIL

REASSESS GARGNANO

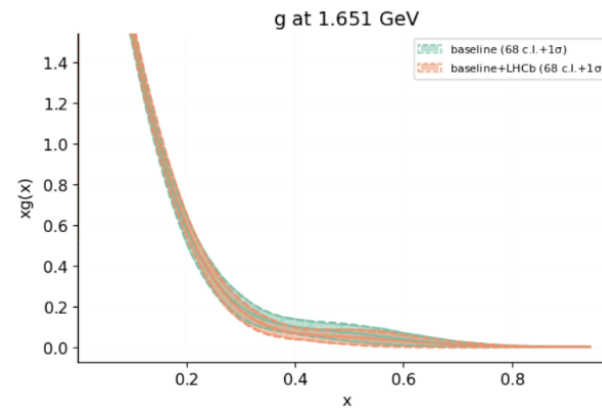
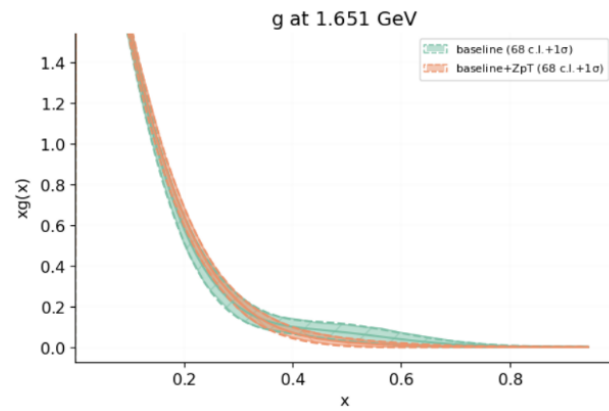
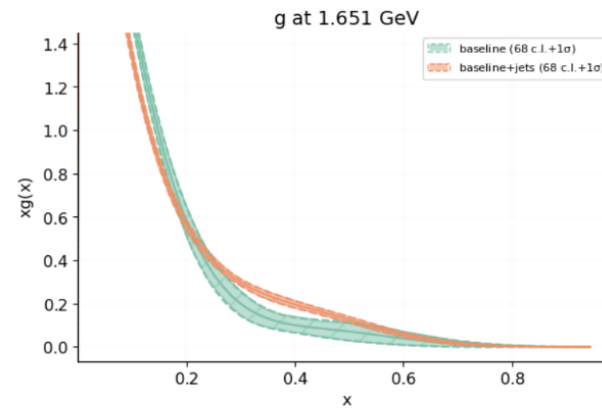
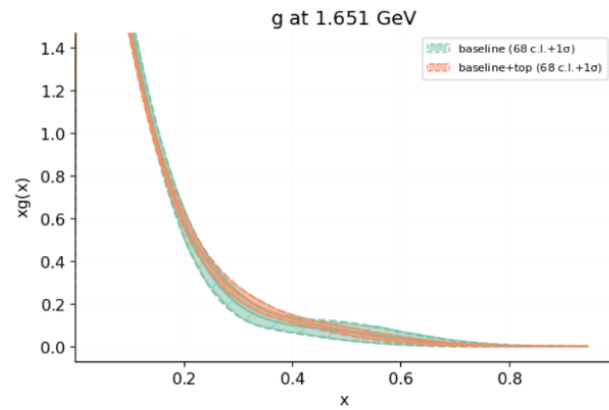
- SIMULT. FITS (TR)
(POC SUMMER '22)
- COMMON DATA (TG, LD, CS, TR, ERN)
(ZK, JCM, AC)
↳ NEW DATA (ERN)
REASSESS GARGNANO 2022
- N³LO (GM, FH, AC)
SUMMER '22
- TOWARDS EW FIT (ERN)
(SYR PRODUCT OF COMMON DATA → GARGNANO 22)

NEW CHALLENGES

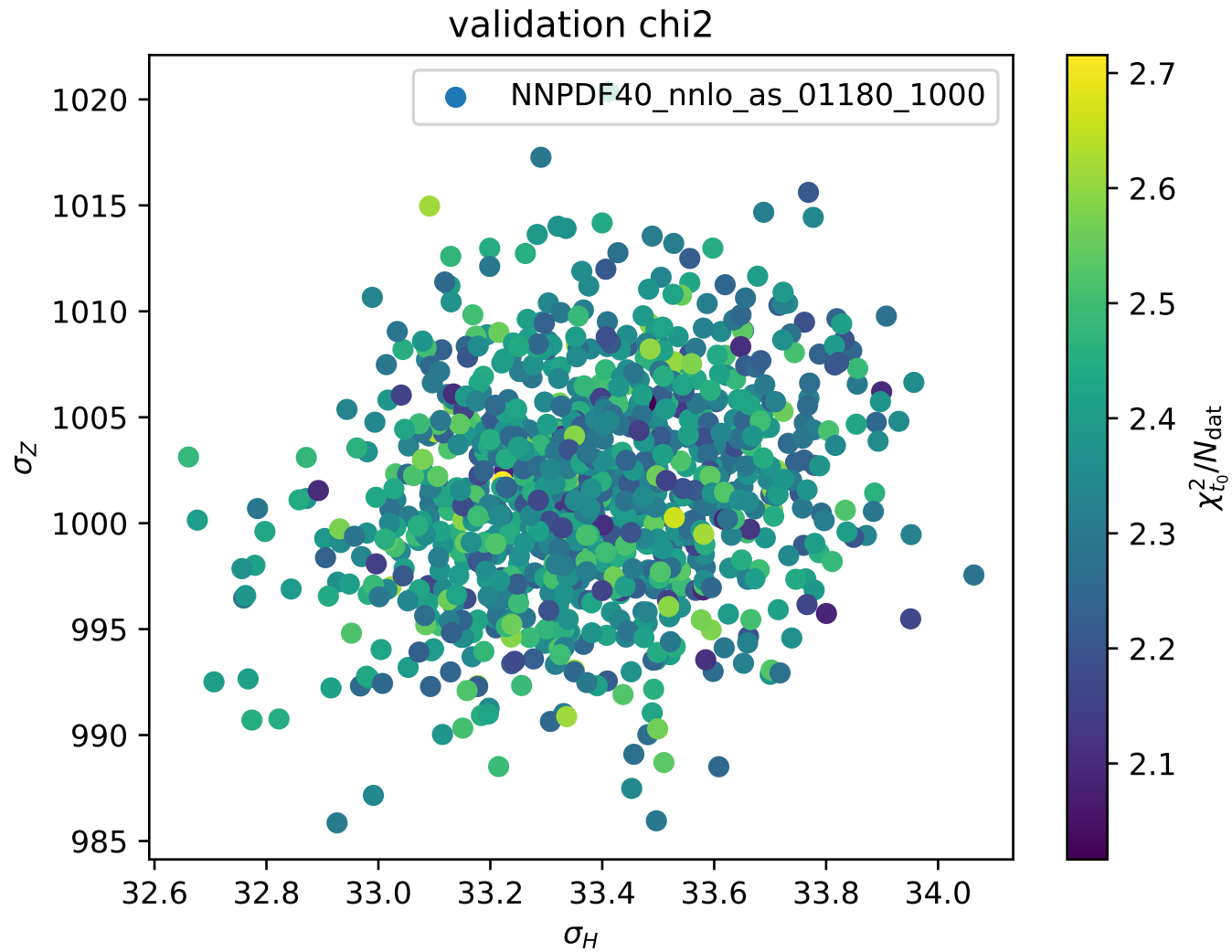
OLD QUESTIONS,
ASKED DIFFERENTLY

DO WE UNDERSTAND...

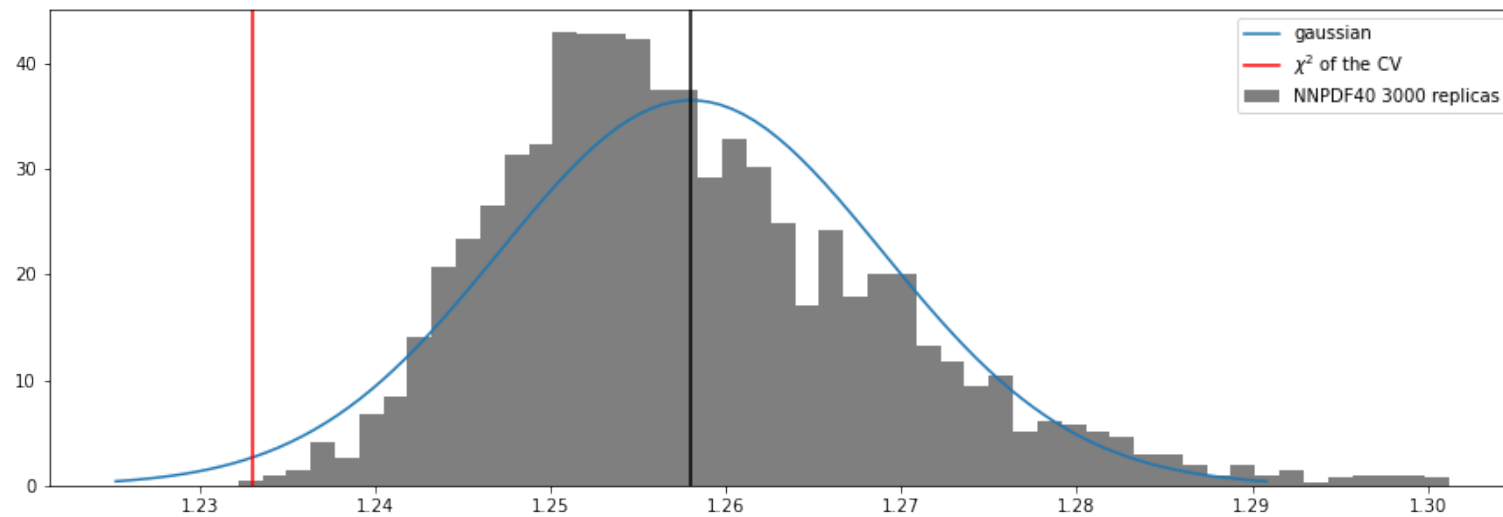
THE IMPACT OF DIFFERENT DATA?



DO WE UNDERSTAND...
THE DISTRIBUTION OF DATA REPLICAS?



DO WE UNDERSTAND...
THE DISTRIBUTION OF FIT QUALITY?



STRATEGIC BALANCE

IMPLEMENTATION

- ELECTROWEAK CORRECTIONS
- THEORY UNCERTAINTIES
- N^3LO
- NEW OBSERVABLES

UNDERSTANDING

- FUNCTIONAL UNCERTAINTY
- EXTRAPOLATION
- THEORY UNCERTAINTIES
- INSIDE THE NN

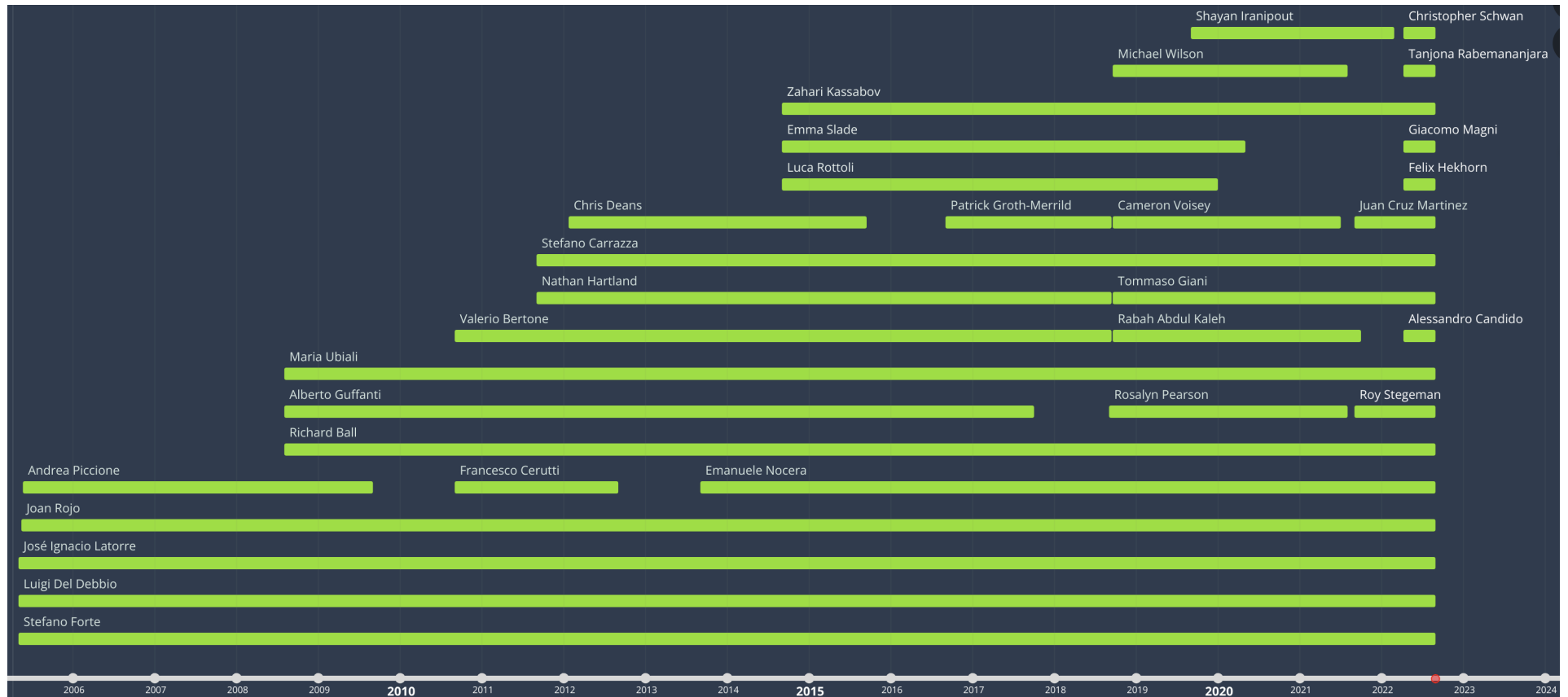
AVENUES

- STATISTICS OF REPLICAS
- NEURAL NETS VS. GAUSSIAN PROCESSES
- EXPLAINABLE AI
- BAYESIAN INFERENCE

FUTURE PLANING

- N3PDF **RUNS OUT** IN MARCH 2023
- **NNPDF** AT THE **COMO SCHOOL** FOR ADVANCED STUDIES JUNE-JULY 2023
- NEXT **GARGNANO MEETING** SEPTEMBER 2023

PERSONNEL NOW



WELCOME AS NNPDF MEMBERS

TO

Andrea Barontini & Niccolò Laurenti