

STAŚ: FLUCTUATING BETWEEN THEORY AND EXPERIMENT



■ STAŚ - THEORIST
■ ■ STAŚ - EXPERIMENTALIST
■ ■ ■ WHO IS STAŚ?



STAŚ - THEORIST

STAŚ'S GREAT ACHIEVEMENTS IN THEORY HAVE BEEN IN DETAIL PRESENTED IN MANY PREVIOUS TALKS

Plasma instabilities at the initial stage of ultrarelativistic heavy ion collisions
S. Mrowczynski (Warsaw, Inst. Nucl. Studies), 1993. 4 pp.
Published in Phys. Rev. Lett. B430 (1997) 273

Color collective effects at the early stage of heavy ion collisions
S. Mrowczynski (Warsaw, Inst. Nucl. Studies), 1994. 4 pp.
Published in Phys. Rev. Lett. B430 (1997) 273

Hard loop effective action for the quark-gluon plasma
Stanislaw Mrowczynski (Warsaw, Inst. Nucl. Studies), 1994. 4 pp.
Published in Phys. Rev. Lett. B430 (1997) 273

Parton Bremsstrahlung as a Mechanism of Energy Deposition in High-energy Hadron Nucleus and Nucleus-nucleus Collisions
S. Mrowczynski, Johann Rafelski (Arizona U.), 1989. 4 pp.
Published in Phys. Rev. C40 (1989) 1077-1080

Towards a relativistic transport theory of nuclear matter
Stanislaw Mrowczynski (Soltan Inst., Swierk), Ulrich W. Heinz (Duke U.), 1994. 6 pp.
Published in Phys. Rev. Lett. B430 (1997) 273

Chromodynamic Weibel instabilities in relativistic nuclear collisions
Jorgen Randrup (LBL, Berkeley), Stanislaw Mrowczynski (Warsaw, Inst. Nucl. Studies & Jan Kochanowski U.), 2003. 6 pp.
Published in Phys. Rev. C68 (2003) 034909

Reheating after supercooling in the chiral phase transition
Stanislaw Mrowczynski (Soltan Inst., Swierk), Berndt Muller (Duke U.), 1995. 4 pp.
Published in Phys. Lett. B363 (1995) 1-4

Generalizing Phi measure of event-by-event fluctuations in high-energy heavy ion collisions
Stanislaw Mrowczynski (Soltan Inst., Swierk & Kielce, Pedagogical U.), 1999. 6 pp.
Published in Phys. Lett. B465 (1999) 8-14

Green Function Approach to Transport Theory of Scalar Fields
Stanislaw Mrowczynski (Regensburg U.), Pawel Danielewicz (Michigan State U.), 1990. 42 pp.
Published in Nucl. Phys. B342 (1990) 345-380

Hadronic matter compressed by event-by-event analysis
Stanislaw Mrowczynski (Soltan Inst., Swierk) & Jan Kochanowski U., Edward V. Shuryak
Published in Phys. Lett. B430 (1997) 273

Stream instabilities of the Quark - Gluon Plasma
Stanislaw Mrowczynski (Bohr Inst.), 1988. 4 pp.
Published in Phys. Lett. B214 (1988) 587, Erratum: Phys. Lett. B430 (1997) 273

Elliptic flow fluctuations
Stanislaw Mrowczynski (Warsaw, Inst. Nucl. Studies & Jan Kochanowski U.), Edward V. Shuryak
Published in Acta Phys. Polon. B34 (2003) 4241-4256

BUT STAS ALSO GREATLY CONTRIBUTED TO:

- EXPERIMENTAL PHYSICS:

(THIS IS PRESENTED IN THE FOLLOWING SLIDES)

AND

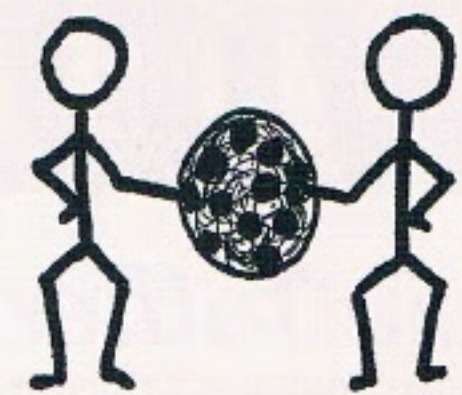
- POPULARIZATION OF SCIENCE: ABOUT 130 ARTICLES !

I WAS PRIVILEGED TO BE CO-AUTHOR OF TWO OF THEM
IN 1994:

W poszukiwaniu utraconych symetrii

NAUKA

**TUŻ PO WIELKIM WYBUCHU
CZYLI O PLAZMIE
KWARKOWO-GLUONOWEJ**



Świat pozbawiony jest ładu. Jest to stwierdzenie oczywiste dla każdego. Wystarczy zajrzeć do pokoju dzieci, spojrzeć przez okno lub włączyć telewizor, aby się przekonać o panującym wokół nas bałaganie. Porozrzucane zabawki po podłodze i gwiazdy po niebie, wojny wybuchające jedna po drugiej oto co możemy zobaczyć. Poszukiwanie porządku w tym bezładnym świecie wydaje się być jednym z głównych motywów działań Człowieka. W przestrzeni ducha doprowadza nas ono do religii i Boga. W świecie materii rezultatem tych poszukiwań jest fizyka współczesna.



STAŚ - EXPERIMENTALIST

AFTER STAŚ'S CPDD 2016

Warsaw University 1975

OUR FRIENDSHIP STARTED HERE ...



Faculty of Physics

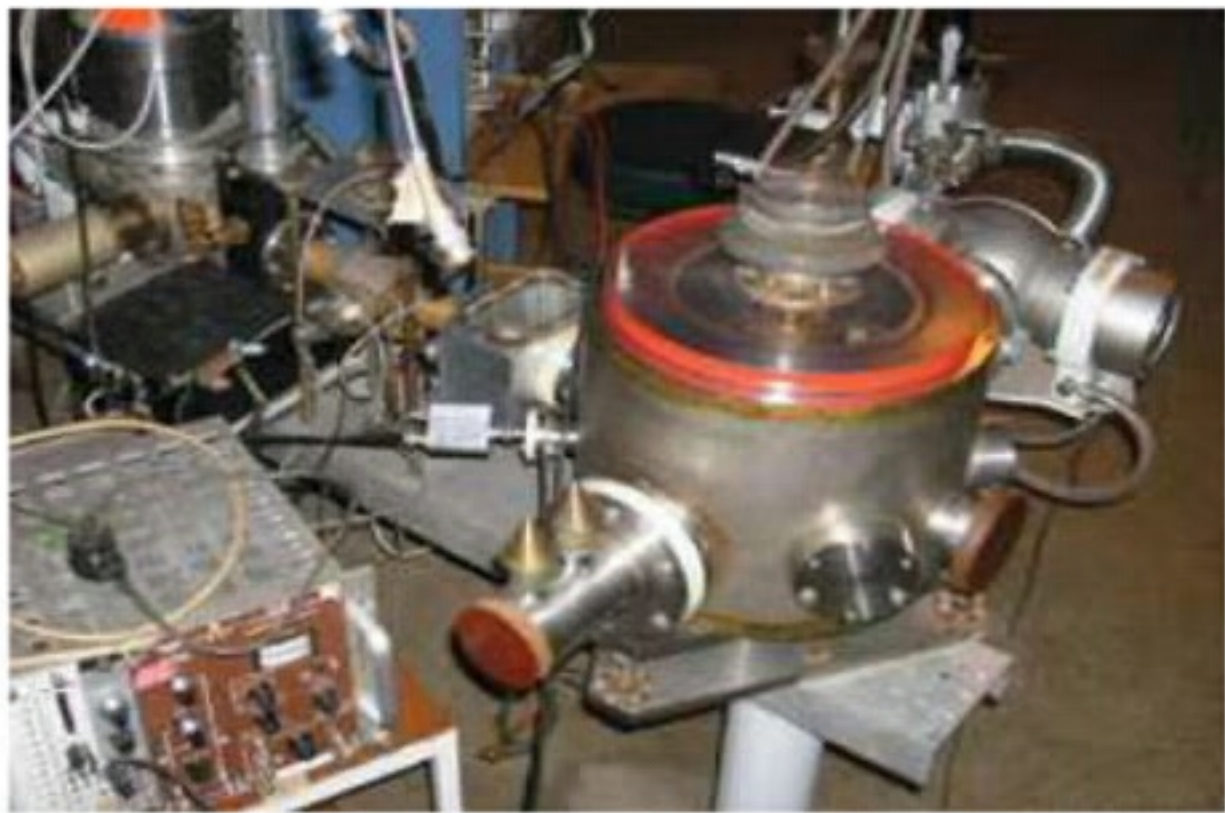
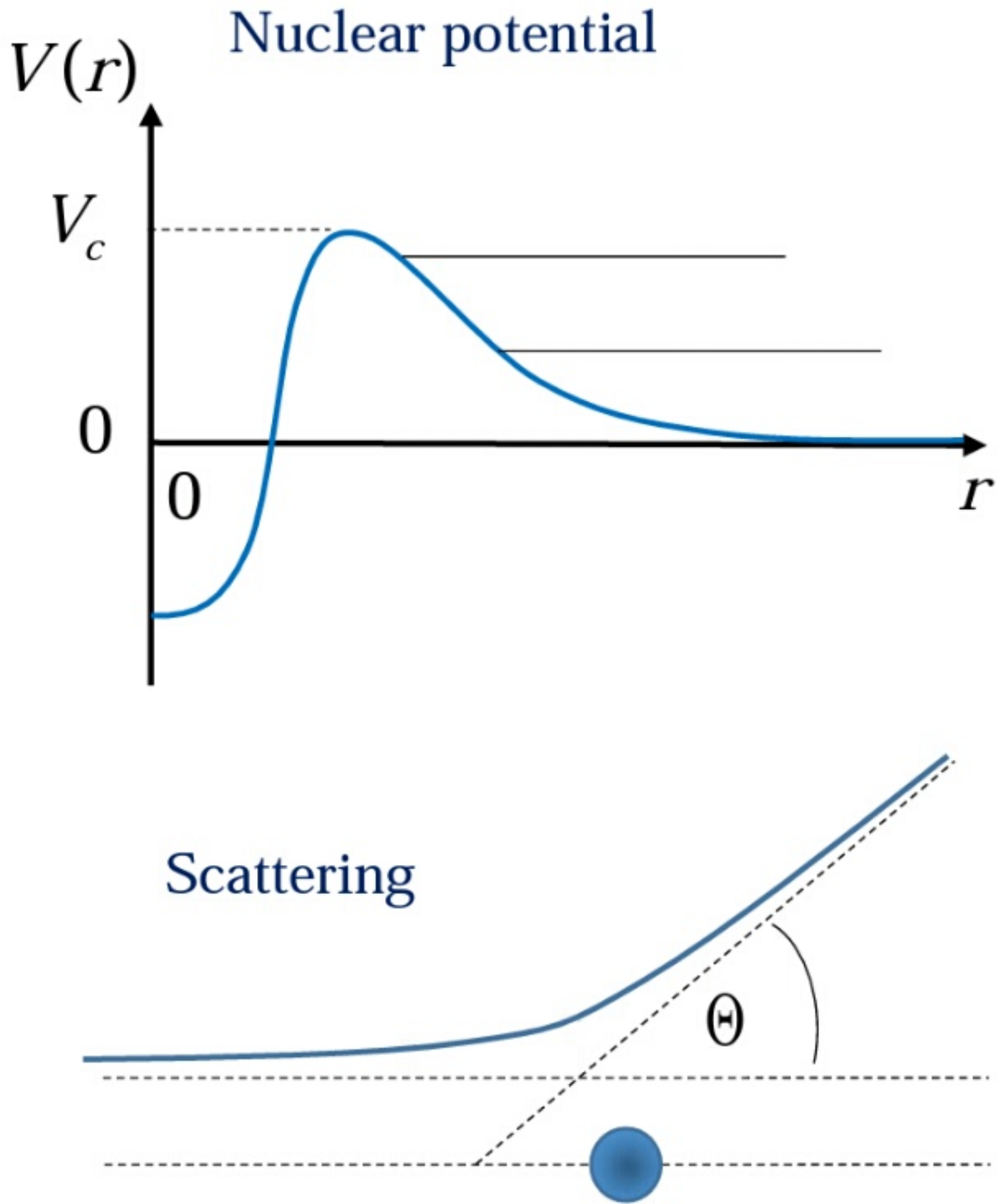
••• WHEN WORKING TOGETHER ON THE EXPERIMENT
AFTER STAS'S CPD 2016

Van de Graaff accelerator



„Lech” (1961 – 2014)

$p, d, {}^3\text{He}, {}^4\text{He}$ accelerated up to 3.2 MeV



Rutherford cross section

$$\frac{d\sigma}{d\Omega} \propto \frac{1}{\sin^4\left(\frac{\theta}{2}\right)}$$

Effect of Coulomb barrier
was observed!

FORMAL RECORD (INSPIRE):

CO-AUTHOR OF 93 EXPERIMENTAL PAPERS:

- 2 DUBNA/WARSAW/LENINGRAD
- 69 NA49
- 20 NA61
- 2 ALICE

IN TOTAL
≈ 4600 CITATIONS



STAŚ'S FIRST EXPERIMENTAL PAPER:

Emission of Light Fragments ^3H , ^3He , and ^4He in ^4He - Nucleus Collisions at $3.33\text{-}\{\text{GeV}\}/n$ Kinetic Energy

L.I. Abashidze (Dubna, JINR) *et al.*. Jun 1984. 17 pp.

Published in **Nucl.Phys. A437 (1985) 573-589**

JINR-E1-84-417

AND THE MOST RECENT ONE:

Production of deuterium, tritium, and ^3He in central Pb+Pb collisions at 20A, 30A, 40A, 80A, and 158A GeV at the CERN SPS

NA49 Collaboration (T. Anticic (Boskovic Inst., Zagreb) *et al.*). Jun 14, 2016. 20 pp.

Published in **Phys.Rev. C94 (2016) no.4, 044906**

DOI: [10.1103/PhysRevC.94.044906](https://doi.org/10.1103/PhysRevC.94.044906)

e-Print: [arXiv:1606.04234](https://arxiv.org/abs/1606.04234) [nucl-ex] | [PDF](#)

AND A RECENT THEORY PAPER:

Production of light nuclei in the thermal and coalescence models

Stanislaw Mrowczynski (Jan Kochanowski U. & Warsaw, Inst. Nucl. Studies). Jul 8, 2016. 6 pp.

e-Print: [arXiv:1607.02267](https://arxiv.org/abs/1607.02267) [nucl-th] | [PDF](#)

IT IS NOT TRUE THAT STAŚ WRITES ONLY PAPERS ON PRODUCTION OF LIGHT NUCLEI! ∇

ESTABLISHING HIGH ENERGY NUCLEAR PHYSICS IN KIELCE

AND COLLABORATION BETWEEN POLISH INSTITUTIONS

2002: STAŚ AND THE KIELCE GROUP JOIN NA49

2005-7: HE LEADS THE GROUP ACTIVITY,
PI OF TWO EXPERIMENTAL GRANTS ON NA49

2006-9: STAŚ AND THE KIELCE GROUP BELONG TO
THE FOUNDING MEMBERS OF NA61/SHINE

2009-12: STAŚ LEADS A CONSORTIUM OF SIX POLISH
INSTITUTIONS WORKING ON NA61/SHINE,
PI OF TWO EXPERIMENTAL GRANTS SUPPORTING
POLISH ACTIVITY WITHIN NA61/SHINE

IN PARALLEL STAS WORKS HARD ON
THE THEORY OF HEAVY ION COLLISIONS



ESTABLISHING HIGH ENERGY NUCLEAR PHYSICS IN KIELCE

AND COLLABORATION BETWEEN POLISH INSTITUTIONS

2003 - 2006: WOJTEK BRONIEWSKI, WAJTEK FLORKOWSKI, PETER SEYBOTH AND MG JOIN THE KIELCE GROUP (THANKS TO STAS' AND MAREK P.)

2005 - NOW STAS' IS THE CO-FOUNDER AND INITIALLY THE KEY ORGANIZER OF POLISH WORKSHOPS ON RELATIVISTIC NUCLEAR COLLISIONS.

IN PARALLEL STA'S WORKS HARD ON
THE THEORY OF HEAVY ION COLLISIONS





WHO IS STAS?

THEORIST OR EXPERIMENTALIST ?

~ INTRODUCING DEFINITIONS

- CHECKING WHICH ONE FITS STAS
BETTER

SCIENTIFIC PROCESS ACCORDING TO KARL POPPER

$PS_1 \rightarrow TT_1 \rightarrow EE_1 \rightarrow PS_2 \rightarrow \dots$

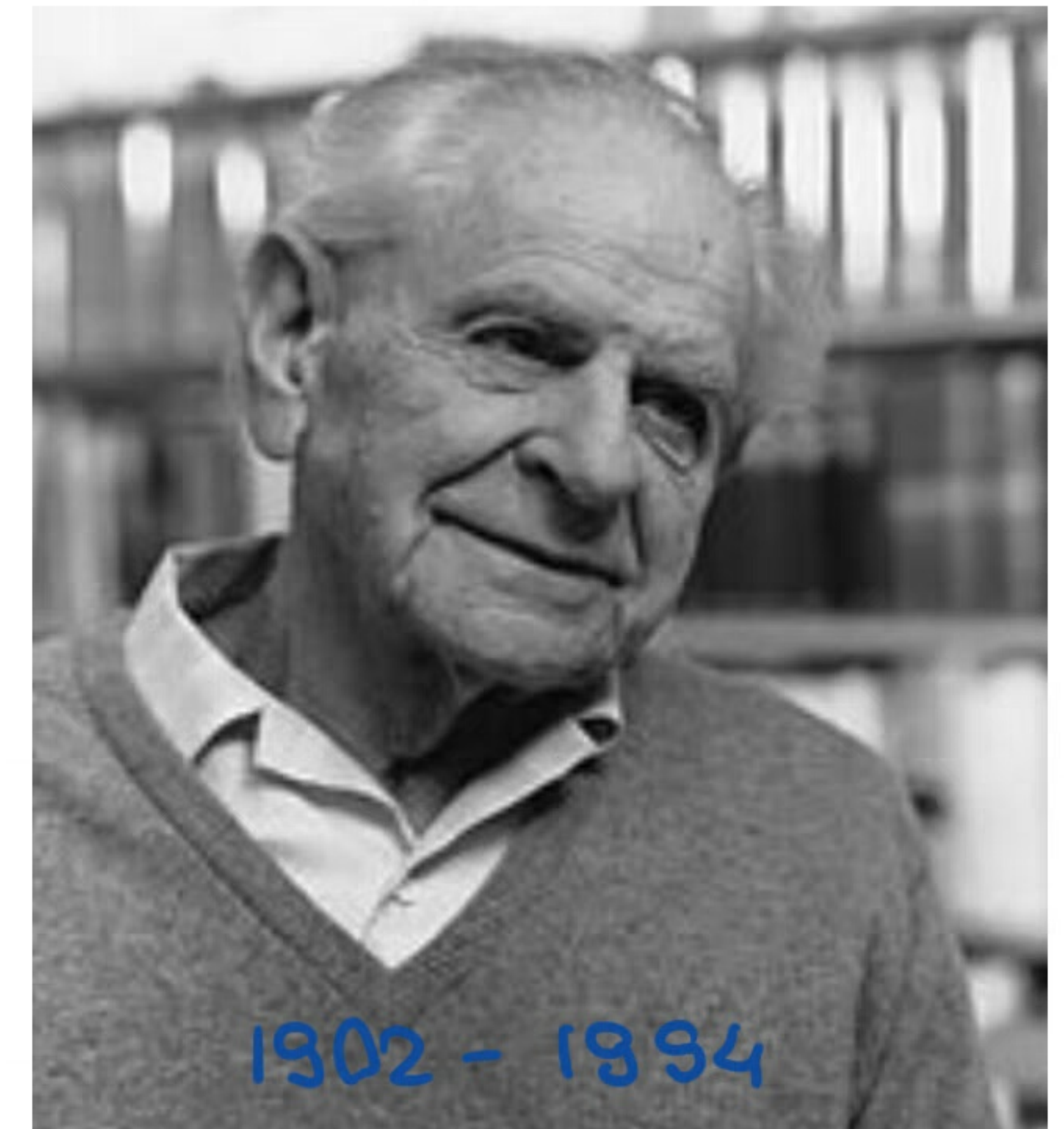
PS - PROBLEM SITUATION

TT - TENTATIVE THEORY

EE - ERROR ELIMINATION

THEORIST - ONE WHO LOVES
TENTATIVE THEORIES

EXPERIMENTALIST - ONE WHO LOVES
ELIMINATING TENTATIVE THEORIES
BY CONFRONTING THEM WITH NATURE



SPRING 2012, ROAD E77 WARSAW - KIELCE

STAŚ: THE STANDARD MODEL IS SO BEAUTIFUL
THE HIGGS BOSON HAS TO EXIST,
IT WILL BE DISCOVERED SOON

MAREK: IT IS JUST ANOTHER TENTATIVE THEORY,
IT IS UNLIKELY HIGGS WILL BE DISCOVERED SOON,
LET US BET ON A BOTTLE OF CHAMPAGNE

STAŚ: THE STANDARD MODEL IS VERY BEAUTIFUL,
BUT BETTING ON A BATTLE OF CHAMPAGNE IS TOO MUCH

SOON AFTER:

The **Higgs boson** (or **Higgs particle**) is a **particle** in the **Standard Model** of **physics**. In the 1960s **Peter Higgs** was the first person to express the idea. On 14 March 2013, scientists at **CERN** tentatively confirm that they have found the particle.

CONCLUSION:

STAŠ IS THE TRUE THEORIST !

"THE STANDARD MODEL
IS BEAUTIFUL" ⇒
⇒ STAŠ LOVES
TENTATIVE THEORIES
⇒ STAŠ IS THE THEORIST

"A BOTTLE OF CHAMPAGNE
IS TOO MUCH TO BET ON" ⇒
⇒ STAŠ KNOWS THERE IS
NO WAY TO BE SURE IT IS
THE TRUE THEORY
⇒ STAŠ IS THE TRUE
THEORIST



WE ARE WISHING STAS
ALL THE SUCCESS AND HAPPINESS
IN THE NEXT 60 YEARS -
- AS HE ACHIEVED
IN THE FIRST 60 YEARS.

