About
National Scientific Centre “Institute of Metrology”,
Kharkov, Ukraine,
for 25th meeting of CCU

Prof. Pavel Neyezhmakov
General Director
The history of National Scientific Centre "Institute of Metrology" began on 8 October, 1901, when at the initiative of an outstanding scientist Dmitry Ivanovich Mendeleyev the first Ukrainian verification chamber was established in Kharkiv with the functions of verification and stamping the trade weights and measures.
History. Time and Frequency

1957

Astronomical pendulum clock AChF with a daily variation of the stroke of 0.001 seconds

1970-1972

An experimental sample of a molecular frequency standard for reproducing the unit of time and frequency with an error $1\times10^{-9}$

Work on the creation of a unified standard of time and length based on quantum generators in the radio and optical range.

Prof. Pavel Neyezhmakov
Ph.D. V. Finkelshtein

Pyrometer EOP-51, which is kept in the museum of NSC "IM"

Les écarts moyens quadratiques du pyromètre EOP-51 sont donnés dans le tableau suivant.

<table>
<thead>
<tr>
<th>Température</th>
<th>Écart moyen quadratique</th>
<th>Écart moyen</th>
<th>Écart moyen quadratique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 500°C</td>
<td>0,1%</td>
<td>0,3</td>
<td>0,3</td>
</tr>
<tr>
<td>9 000</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
</tr>
<tr>
<td>10 000</td>
<td>1,5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Avril 1958)

Institut de Métrologie D. I. Mendòléov (U. R. S. S.)

NOUVELLE MÉTHODE
POUR L’ÉTALONNAGE DES PYROMÈTRES OPTIQUES.
NOUVEAU PYROMÈTRE OPTIQUE
DE PRÉCISION (†)

Par V. E. PHINKELSCHTEIN et V. V. KANDIBA

* — 1 440 —

L’œil de l’observateur. L’utilisation d’un tel diaphragme permet d’obtenir au cours des mesures la brillance la plus commune pour l’œil.

Le pyromètre est muni de quatre verres absorbants destinés à étendre le domaine de l’échelle. En outre, sa construction permet d’employer des secteurs tournants comme systèmes de graduation.

La combinaison des verres absorbants (pour les mesures des températures jusqu’à 3 000° C) est montée sur un support tournant situé entre l’objectif et la lentille pyrométrique.

Fig. 3.

Le verre absorbant supplémentaire (n-6 000), destiné aux mesures dans l’intervalle à 3 500-6 000°C, a un diamètre de 80 mm; il est placé devant le tube de l’objectif du pyromètre afin de diminuer son échauffement au cours des mesures aux hautes températures [5].

En introduisant simultanément les deux systèmes de verres absorbants — le verre n-6 000 et la combinaison de verres colorés, montés sur un support commun — en a la possibilité d’étendre (†)
These studies have formed the basis for laser range measurements.

### Table IV. Summary of some velocity-of-light measurements made since 1948

<table>
<thead>
<tr>
<th>Year of publication</th>
<th>Author</th>
<th>Method</th>
<th>$c$ (km/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>Simkin, Lukin, Sikora, and Streelnik</td>
<td>MWI</td>
<td>299 792.56±0.11</td>
</tr>
</tbody>
</table>

The 1973 Least-Squares Adjustment of the Fundamental Constants*

TABLE 14.1. Summary of $\gamma$ determinations

<table>
<thead>
<tr>
<th>Publication date, laboratory*, and author</th>
<th>$\gamma$</th>
<th>$\gamma$</th>
<th>$\gamma$</th>
<th>Uncertainty (ppm)</th>
<th>Eq. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Field</td>
<td>$10^9$ s$^{-1}$ T$^{-1}$ lab</td>
<td>$10^9$ s$^{-1}$ T$^{-1}$ lab ref</td>
<td>$10^9$ s$^{-1}$ T$^{-1}$ lab obs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968, ETL Hauser et al.</td>
<td>2.6751384(107)</td>
<td>2.6751449(107)</td>
<td>2.6751196(107)</td>
<td>4.0</td>
<td>(14.1)</td>
</tr>
<tr>
<td>1972, NES Ohsen and Briscoe*</td>
<td>2.6751344(54)</td>
<td>2.6751370(54)</td>
<td>2.6751167(54)</td>
<td>2.0</td>
<td>(14.2)</td>
</tr>
<tr>
<td>1965, NPL Vigoureux*</td>
<td>2.6751707(107)</td>
<td>2.6751400(107)</td>
<td>2.6751167(107)</td>
<td>4.0</td>
<td>(14.3)</td>
</tr>
<tr>
<td>1971, VNIM Malyarenkova, Studentov, and Shifrin*</td>
<td>See text.</td>
<td>2.6751100(101)</td>
<td>2.6751100(101)</td>
<td>6.0</td>
<td>(14.4)</td>
</tr>
<tr>
<td>High Field</td>
<td>$10^9$ A$_{125}$ s$^{-1}$ kg$^{-1}$</td>
<td>$10^9$ A$_{132}$ s$^{-1}$ kg$^{-1}$</td>
<td>$10^9$ A$_{129}$ s$^{-1}$ kg$^{-1}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1966, KI/NIIM Yakoga, Zingerman, and Sepety*</td>
<td>2.6750795(20)</td>
<td>2.6751030(20)</td>
<td>2.675130(20)</td>
<td>7.4</td>
<td>(14.5)</td>
</tr>
<tr>
<td>1971, NFL Kibble and Hasi*</td>
<td>2.6750735(43)</td>
<td>2.6750735(43)</td>
<td>2.6750735(43)</td>
<td>16</td>
<td>(14.6)</td>
</tr>
</tbody>
</table>

* ETL = Electrotechnical Laboratory, Japan; KI/NIIM = Kharkov State Scientific Research Institute of Metrology, U.S.S.R.

Metrology for society

Promoting the protection of the consumer rights, ensuring the high quality of life

- Development of measurement methods and instruments necessary for all spheres of human living and household activities
- Health and life protection
- Control of the environment and safety of working conditions
- Protection of consumers during trade operations and transactions
- Reliable measurements in the sphere of public utilities (electricity, gas and water supply)

International relations

Elimination of technical barriers in trade, unification of measurement system

- Cooperation with other National Metrology Institutes
- Harmonisation of normative documents and elimination of non-tariff barriers in trade
- Participation in international metrological organisations
- Promoting the international unification of metrology

Metrology for economy

Increasing the efficiency of economy, innovation, employment security

- Metrological certification, calibration and verification of measuring instruments
- Metrological review of technical documentation
- Development and certification of measurement techniques
- Development of the national measurement standards, including those harmonised with the international ones
- Certification of calibration laboratories

Fundamentals of metrology

Developments related to reproduction, maintenance and transfer of SI units

- Fundamental and applied scientific research
- Creation of scientific and technical base for metrological system that meets up-to-date requirements
- Scientific and methodological support of metrological activity
- Certification training of metrologists
The National Measurement Standards of Ukraine
Ukraine participates in the Arrangement since 2003

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>AUV</th>
<th>EM</th>
<th>L</th>
<th>M</th>
<th>PR</th>
<th>QM</th>
<th>RI</th>
<th>T</th>
<th>TF</th>
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</thead>
<tbody>
<tr>
<td><strong>NSC &quot;Institute of Metrology&quot;</strong></td>
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<tr>
<td>KC</td>
<td>17</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>SC</td>
<td>44</td>
<td>-</td>
<td>2</td>
<td>21</td>
<td>10</td>
<td>4</td>
<td>-</td>
<td>6</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>CMC</td>
<td>180</td>
<td>-</td>
<td>19</td>
<td>28</td>
<td>7</td>
<td>8</td>
<td>-</td>
<td>15</td>
<td>73</td>
<td>30</td>
</tr>
</tbody>
</table>
Since 1995, NSC “Institute of Metrology” has been publishing “Ukrainian Metrological Journal“ (UMJ) specialized in scientific and technical edition.

UMJ web-site address: www.umj.metrology.kharkov.ua

“Ukrainian Metrological Journal” is indexed by an international bibliometric and scientometric database of Google Scholar.

The edition has an identifier for a digital object (DOI: 10.24027 / 2306-7039).
In July 2019 UMJ was included in the leading scientometric, abstract, international citation database in the world Web of Science Core Collection (Web of Science until 2014).

Since 2014, NSC “Institute of Metrology” has been publishing the “Information Bulletin on International Metrology”, which is published twice a year.

The Bulletin acquaints readers with the activities of international and regional organizations on metrology and their documents, as well as with the metrological infrastructure of different countries of the world.
Since 1996 NSC “Institute of Metrology” performs biennially the **International Scientific & Technical Conference “METROLOGY AND MEASUREMENT TECHNIQUES”**. 

**In 2020 there was held XII Conference.**

**The purpose of the conference is to promote the development of** metrology and to implement its achievements in researches, practice and study.

**138 reports were submitted from 10 countries:** the Republic of Belarus, the Czech Republic, Estonia, Lithuania, Italy, the Russian Federation, the Republic of Poland, the Republic of Azerbaijan, the Republic of Uzbekistan and Ukraine.

The conference included 8 thematic sections and a seminar "Measurement Uncertainty: Scientific, Applied, Regulatory and Methodological Aspects".

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**BYM Competition 2021**

**COOMET**

**Ninth International Competition: “The Best Young Metrologist of COOMET 2021”**

21–22 April 2021 (online)

Prof. Pavel Neyezhmakov,
COOMET Vice-President

Mrs. Yuliya Bunyayeva,
National COOMET Secretariat in Ukraine
International activity

In 2021 representatives of NSC “Institute of Metrology” took part in:

CIMP workshop “The International System of Units (SI) in FAIR digital data”
22–26 February 2021

International Scientific and Practical Conference
“Sensor and Measurement Science International” (SMSI 2021)
3–6 May 2021

13th International Conference “Measurement 2021”
17–19 May 2021

14th International Conference on New Developments and Applications in
Optical Radiometry (NEWRAD 2021)
21–24 June 2021

IMEKO XXIII World congress (IMEKO2021)
30 August – 3 September 2021

Participation in CCs meeting:
24th meeting of the CCPR, 19 to 20 September 2019
29th meeting of the CCT, October 2020 to February 2021
22nd meeting of the CCTF, October 2020 to March 2021
18th meeting of the CCM, 20 to 21 May 2021
28th meeting of the CCRI, 8 to 10 June 2021
Thank you for your attention!

Prof. Pavel Neyezhmakov