EXPLANATION OF PUBLIC PROCUREMENT NO. 5

Public Procurement title - **Optical delay lines kits for ultrashort laser pulses**

Contracting authority

Name of the contracting authority:	Institute of Physics of Academy of Sciences of the Czech Republic, public research institution
Registered office:	Na Slovance 2, Praha 8, PSČ: 182 21
Identification No.:	68378271
Tax Identification No.:	CZ68378271
Person authorized to act on behalf of the contracting authority:	RNDr. Michael Prouza, Ph.D., director

("**Contracting Authority**")

above mentioned Contracting Authority pursuant to Rules for the applicants and recipients ("**Rules**") applicable within the Research, Development and Education Operational Programme ("**OP VVV**") is hereby announcing explanation of the above mentioned Public Procurement based on the request to explain the Public Procurement received on Thursday 13th September 2018.

Question 1 - Absolute accuracy in delay / Precision :

In the answer to Question 1 of the Explanation of Public Procurement no. 3, the Contracting Authority gives some explanations about the absolute accuracy in delay and how it is related to the absolute accuracy in position of a stage. However, the main question is unfortunately not answered very clearly.

In the Tender Specifications, the Contracting Authority uses the word "Accuracy in the optical delay". Please note that not the term "Absolute accuracy" is used but only "Accuracy". As an explanation in brackets it says "including error and bidirectional repeatability of stage". Here the word "Error" is used.

In the Evaluation Criteria, the Contracting Authority uses the words "Precision (including both absolute accuracy and bi-directional reproducibility)", thus "Precision" and "Absolute accuracy"

*Different manufacturer uses different terms and methods to describe the "Precision", "Accuracy" or "Absolute Accuracy" of their stages. Since the parameter "**Precision**" is an **important evaluation criteria**, it is very important to **understand exactly**, what is meant with this parameter and how the Contracting Authority will evaluate it.*

Does the Contracting Authority with the words "Precision", "Accuracy" or "Absolute Accuracy", actually mean "Encoder Resolution", from some manufacturers also called "Design Resolution", which describes the smallest possible displacement, the position sensor can measure?

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Answer to the Question 1:

By accuracy and precision we mean the same thing.

It can be either precision / accuracy in the positioning (in length units) Δx, or precision /accuracy in terms of (optical) delay Δt.

Each time the precision/accuracy in the delay Δt is mentioned, it is meant as the precision/accuracy in delay which is directly related to the precision/accuracy in the positioning (or displacement) by the following relation:

$\Delta t = 2\ \Delta x\ /\ \text{c}$

The precision/accuracy in the positioning Δx is considered as the sum of the

- Absolute on-axis accuracy in the positioning
- And the bi-directional repeatability.

The absolute on-axis accuracy is the uncertainty regarding the position of the stage returned by the device (for example the value displayed by software to indicate position). It is the measure of how well the value of the position returned by the device fits the actual (real, exact, absolute) position.

For example if the absolute on-axis accuracy is δx and the stage return the status of its position to be x then the real, absolute position is $x \pm \delta x$, i.e. for sure, the real position is within the range from $x - \delta x$ to $x + \delta x$. The absolute on-axis accuracy is not the smallest possible displacement of the stage nor the delay associated with it. The latter being termed "minimum incremental delay" in the technical specifications.

From this explanations, some terms in the Invitation to submit a bid are clarified/corrected hereafter:

In section 12.2,

- in the **3 last** Quality and performance sub-criteria in the table, the statement:

"Precision (including both absolute accuracy and bi-directional reproducibility) of the stage in terms of delay over 0-500ps delay range…"

Must be understood as:

" Precision (including both absolute **on-axis** accuracy of the positioning and bi-directional reproducibility) of the stage in terms of delay over 0-500ps delay range…"

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<u>In Annex I, in the updated (Explanation 1) Cover sheet of the bid,</u>

- in the **3 last** Quality and performance sub-criteria in the table, the statement

"Precision (including both absolute accuracy and bi-directional reproducibility) of the stage in terms of delay over 0-500ps…"

Must be understood as

"Precision (including both absolute **on-axis** accuracy **of the positioning** and bi-directional reproducibility) of the stage in terms of delay over 0-500ps…"

<u>In the Annex no 3 (technical specifications)</u>

- In the second paragraph, the statement:

"with an accuracy (error comprising both the on-axis absolute accuracy in the stage positioning and bidirectional repeatability of the stage)"

Must be understood as:

"with an accuracy (**precision** comprising both the absolute on-axis accuracy and bidirectional repeatability of the stage **positioning**)"

- In each of the table for ODL kit of Group 1, 2 and 3:

The statement:

"Accuracy in the optical delay (including error and bidirectional repeatability of stage) over the 0-500 ps delay range"

Must be understood as:

"Accuracy in the optical delay (including **both absolute on-axis accuracy** and bidirectional repeatability of stage **positioning**) over the 0-500 ps delay range"

Additionally, some of our previous answers must be clarified/corrected:

<u>In the Explanation no 2</u>

- Regarding answer to Question 2

The statement:
"However, it is stressed that the absolute error in delay –due to 2 times (back and forth travels of the beam) the sum of absolute accuracy of positioning and bi-directional reproducibility…"

must be understood as:

"However, it is stressed that the **accuracy** in delay –due to 2 times (back and forth travels of the beam) the sum of absolute **on-axis** accuracy of positioning and bi-directional reproducibility…"

<u>And therefore in the Explanation no 3</u>

- The statement:
  "… define the absolute accuracy in delay, Delta_t , by the accuracy in the positioning of the stage:
  Delta_t = 2*Delta_x/c
  where Delta_x is the sum of absolute accuracy in positioning + the bi-directional reproducibility
  …"

  must be understood as:

  "… define **the accuracy** in delay, Delta_t , by the accuracy in the positioning of the stage:
  Delta_t = 2*Delta_x/c
  where Delta_x is the sum of absolute **on-axis** accuracy in positioning + the bi-directional reproducibility
  …"

- The statement:

  "The absolute accuracy in positioning is the uncertainty related to…"

  Must be understood as:

  "The absolute **on-axis** accuracy in positioning is the uncertainty related to…"

- And the statement:

  "If the devices […] still provide the required absolute accuracy in the delay when back to the arbitrary given position…"

  Must be understood as:

  "If the devices […] still provide the required **accuracy** in the delay when back to the arbitrary given position…"

From these clarifications we believe we answered all interrogations.

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The Contracting Authority has decided to extend the bids´ submission deadline till 1st October 2018 10AM.

Bids shall be submitted not later than on 1st October 2018 at 10:00 AM.

No other Public Procurement conditions have been amended based on this Explanation of Public Procurement No.5.

In Prague, on 17th September 2018