UGC-DAE Consortium for Scientific Research
(An Autonomous Institution under University Grants Commission)
University Campus, Khandwa Road, Indore- 452001 (India)
Phone : +91 0731 2361546, 2463913, 2762267 Fax : +91 0731 2361546, Website: www.csr.res.in E-mail:iucstores@csr.res.in

Item No-1: Femtosecond Laser with OPA and Synchronization Unit
Global Tender Enquiry (GTE) 06/2025-26 dated 06-02-2026 due On 09-03-2025

TWO PARTS TENDER ITEM

Technical Specifications of the Femtosecond Laser with OPA and Synchronization Unit

Introduction:

The femtosecond (fs) laser, along with the OPA and synchronization unit, will be used for optical pump- Free Electron Laser (FEL) probe or vice versa at the IR FEL Facility RRCAT in Indore, India. The FEL's electron bunches are generated from a thermionic electron gun, making the FEL RF-driven. To synchronize FEL pulses (micro-pulse repetition rate of 59.5 MHz) with optical femtosecond laser pulses, we need to synchronize the fs laser with the RF master clock that drives the FEL. This involves accurately locking the laser's repetition rate to 59.5 MHz, which matches the FEL micro-pulse repetition rate through the RF master clock at 2856 MHz, and enabling precise phase locking of FEL pulses with optical pulses.

The laser, along with the Optical Parametric Amplifier (OPA) should have the following wavelength outputs:

Amplifier Part:

1. 1030 nm (≥ 50W: ≥ 500 µJ at 100 kHz)
2. 515 nm (≥ 25W: ≥ 250 µJ at 100 kHz)

OPA Part:

3. Near-Infrared Range (NIR): ≤680 nm to ≥950 nm
4. SHG of Near-Infrared Range (SHG-NIR): ≤340 nm to ≥475nm
5. Short-Wave Infrared (SWIR) wavelength range: ≤1120 nm to ≥2100 nm
6. SHG of Short-Wave Infrared (SHG-SWIR) wavelength range: ≤560 nm to ≥1050 nm

The simultaneous laser outputs of 1030nm, 515nm, NIR outputs, andor SHG-NIR output and SWIR andor SHG-SWIR output are required.

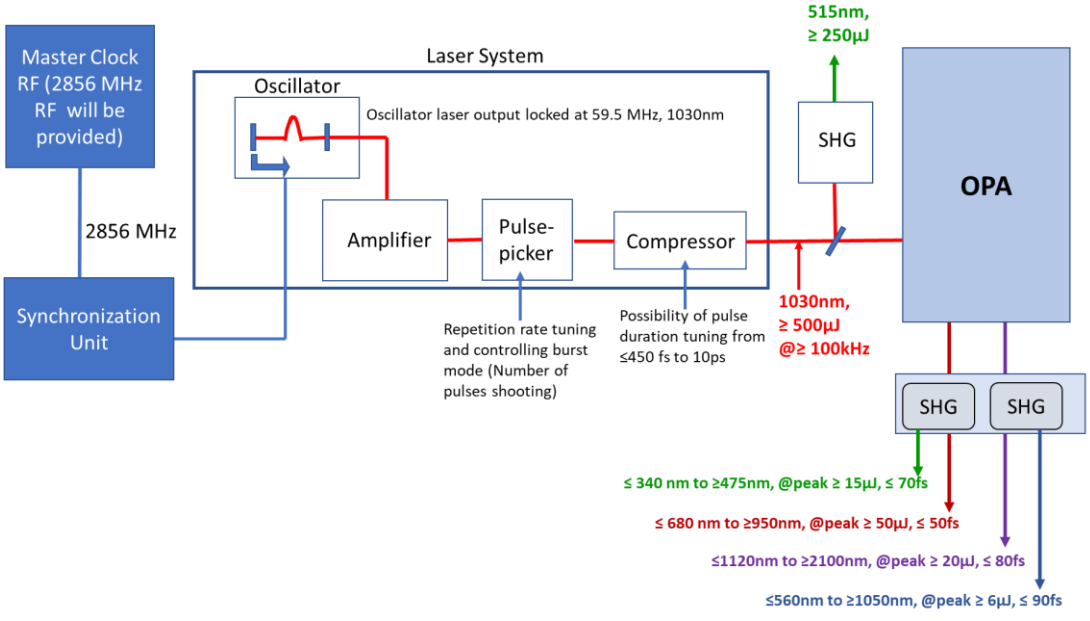

Fig 1: Block diagram of the required system including synchronization unit, laser and OPA.

Item No-1: Femtosecond Laser with OPA and Synchronization Unit
Global Tender Enquiry (GTE) 06/2025-26 dated 06-02-2026 due On 09-03-2025

TWO PARTS TENDER ITEM

S No	Main Part	Specifications
1	Femtosecond laser with synchronization unit	**Laser Oscillator with RF synchronization capability:** (i) Oscillator with a synchronization module to have an electronic synchronization on RF signal from the FEL. - Fiber/solid-state oscillator with additional actuators - Fast feedback (piezo) + slow feedback (translation stage) - Master clock: RF = 2856 MHz - All necessary control electronics for the repetition-rate locking - The synchronization unit should be able to phase-lock the optical pulses with FEL pulses through RF master clock. (ii) Oscillator Specifications: - Average Power: ≥10mW @1030nm - Central wavelength: 1030 +/- 2 nm - Repetition rate: 59.5MHz - Jitter: < 150 fs from 10 Hz to 10 MHz (SSA Measurement reports should be provided) (iii) Oscillator should Include also a remote delay line to have the following specifications: - Fixed delay, from ≤150 fs up to infinite - Frequency shift: -10 kHz to +10 kHz with an accuracy of 20 µHz (iv) Software interface for synchronization: -The synchronization unit should be software-controlled -There should be an option to enable or disable synchronization for standalone laser operation when synchronization is not required. The option to enable synchronization should be accessible through the software interface and/or an ON/OFF button when it's needed. **Laser amplifier:** (i) The output energy of the oscillator should be then injected into an Yb amplifier to increase the energy and in consequence the output average power. (ii) 2 AOM should be included in this amplifier. The first one to define the repetition rate of the amplifier and the second one to define the

TWO PARTS TENDER ITEM

		repetition rate of the laser to allow to have ≥ 50W from 100kHz to 59.5MHz and the maximum energy (≥ 500µJ) from single shot to 100kHz. (iii) The synchronization system, along with the pulse-picker/AOM, should be capable of phase-locking optical pulses to FEL pulses using RF signals in the later stages of the oscillator to address any phase shifts or delays. More Precisely, after the amplifier output, we need to achieve phase locking of the optical pulses at the amplifier's repetition rate of 100 kHz with the FEL pulses. And, the system should allow for phase locking of optical pulses to FEL pulses across variable macro-bunch repetition rates from 1 to 10 Hz using the corresponding provided RF/TTL reference signals. (iv) Other Specifications: -Energy: higher or equal to 500µJ@1030nm at 100kHz -Central wavelength: 1030 +/- 2 nm - Average Power: ≥ 50W -Repetition rate: tunable, single shot to 59.5MHz - Pulse duration: <450fs FWHM, Variable pulse width control from <450fs to 10 ps -Spectral bandwidth: ~ 3nm -Shot-to-shot stability: < 1% rms -Power stability: < 0.5% rms over 8h -Pointing stability: < 20 µrad/°C -Astigmatism: < 25% -M2: < 1.2 (v) Laser outputs: Fundamental -1030nm, ≥ 50W: ≥ 500 µJ at 100 kHz SHG-515nm ≥ 25W, ≥ 250 µJ at 100 kHz (Pump SHG: Efficiency >50%, with a dedicated output) The beam diameter@ 1030nm ≤ 4.5mm +/- 0.5mm @ 1/e2. (vi) Computer and software interface: All control and diagnostics software loaded for the

		laser and synchronization unit and tested on a Latest, branded laptop with latest hardware and software configuration should be offered. The laptop should have at least 500GB SSD storage memory and 16GB RAM and i7 2.5GHz processor. (vii) Other accessories: All essential accessories (for example, chiller, cables, connectors etc) to successfully run the laser system and synchronization unit should be provided along with the laser system.
2	Optical Parametric Amplifier (OPA)	(i) OPA module should be optimized for repetition rates between 10Hz-10kHz and at 100kHz. Manual intervention in the system to switch the repetition rate option is required. (ii) OPA should be capable to offer a Spectral range ~ 340-2100 nm (a) Near-Infrared Range (NIR): ≤680 nm to ≥950 nm ○ Pulse duration <50 fs at peak, <80 fs on full range ○ Pulse energy ≥ 50 µJ at peak, ≥ 30 µJ on full range at ≥ 100 kHz (b) Short-Wave Infrared (SWIR) wavelength range ≤1120 nm to ≥2100 nm ○ Pulse duration <80 fs at peak, <100 fs on full range ○ Pulse energy ≥ 20 µJ at peak, ≥ 10 µJ on full range at ≥ 100 kHz (c) SHG of Near-Infrared Range (SHG-NIR): ≤340 nm to ≥475nm ○ Conversion efficiency from NIR to SHG-NIR ≥ 30% at peak ○ SHG-NIR spectral Coverage: ≤340 nm to ≥475nm (d) SHG of Short-Wave Infrared (SHG-SWIR) wavelength range: ≤560 nm to ≥1050 nm ○ Conversion efficiency from SWIR to SHG-SWIR ≥ 30% at peak ○ SHG-SWIR spectral Coverage: ≤560 nm to ≥1050nm

		(iii) Power stability <1 % rms on 8 h at peak wavelength (iv) Shot to shot stability <1.5% rms on 1000 non consecutive shots at peak (v) Pointing stability <25 µrad rms at peak (vi) Waist circularity >80% (typical >90%) (vii) M2 < 1.3 at peak-wavelength (viii) At OPA output, we could able to access the full pump beam of OPA i.e., 1030nm at ≥ 50W: ≥ 500 µJ at 100 kHz and SHG of pump beam i.e., 515nm ≥ 25W, ≥ 250 µJ at 100 kHz with SHG efficiency ≥ 50% (ix) The OPA system must have an independent laptop or computer control of all components with unified software control to allow operators to adjust system parameters and verify the status of the optimization loops. All control and diagnostics software loaded for OPA and tested on a Latest, branded laptop with latest hardware and software configuration should be offered. The laptop should have at least 500GB SSD storage memory, 16GB RAM, and i7 @2.5GHz processor.
3	Installation, Warranty, Training and Services	(i) The spares for Laser, Synchronization unit and OPA system should be available for 15 years from the date of Installation. (ii) Installation, complete interfacing of the system with its subsystems such as oscillator, amplifier, OPA, synchronization system and commissioning is to be carried out by the vendor's factory-trained engineers. (iii) The offer should include certified advanced training for two individuals at the factory. This training should focus on troubleshooting major and most frequently occurring issues that may arise in the future of system operation, as well as providing in-depth training related to the laser, synchronization unit, and OPA to enable

		independent handling and maintenance of the systems. The vendor should also provide boarding and lodging during the training. (iv) Onsite training after installation should be included in the offer. (v) **Warranty:** A complete system (Laser-Oscillator and amplifier, Synchronization system, OPA and all accessories) warranty of ≥ 3 years, should be included. The date of successful installation has to be considered as the warranty start date. (vi) Warranty should be supported by Performance Bank Guarantee (10 % payment will be made after the warranty period is over). (vii) Supplier should clearly mention about their service setup in India for prompt service support along with contact details of service engineers specially trained on the offered system. The service engineers should be certified by the Original Equipment Manufacturer (OEM). Service should be provided within 7 working days from the report of a technical problem so that machine down time is minimized. Service should be provided at earliest and 24 X 7 online support should be available.
4	Preconditions Acceptance Criteria before dispatch	The factory test report before dispatch should be sent for approval. (i) The pulse width at peak/central wavelengths of the regimes NIR (680nm to 920nm), SWIR (1120nm to 2100nm), and SHG-SWIR (560nm-1050nm) should be measured on the same pump laser being dispatched. This should be shared before dispatching the material. The output power of OPA at different wavelength range or exact tuning curve of OPA (output power/pulse energy vs. wavelength) must be measured and shared before permission for dispatch. (ii) Typical tuning curve of OPA (output power/pulse energy vs. wavelength) should be provided along with the quotation.

		(iii) The demonstration report of oscillator locking to 59.5 MHz should be provided (iv) The supplier should offer after-sales local service through the engineers of the Indian representative trained by the supplier. Names of such service personnel should be furnished along with the quotation.
5	Acceptance Criteria	The following specifications must be reproduced at user's site (UGC-DAE CSR Indore/FEL RRCAT Indore). (i) Demonstration of OPA wavelength tuning range: 340 - 2100 nm -1030 nm (≥ 50W: ≥ 500 µJ at 100 kHz) -515 nm (≥ 25W) -Near-Infrared Range (NIR): ≤680 nm to ≥950 nm -SHG of Near-Infrared Range (SHG-NIR): ≤340 nm to ≥475nm -Short-Wave Infrared (SWIR) wavelength range: ≤1120 nm to ≥2100 nm -SHG of Short-Wave Infrared (SHG-SWIR) wavelength range: ≤560 nm to ≥1050 nm (ii) Pump pulse energy (amplifier output): ≥ 500 µJ at 100 kHz, 1030nm, SHG of Pump ≥ 250 µJ at 100 kHz, 515nm (iii) OPA Output Energy at peak/central wavelength a. 1120nm-2100nm : ≥ 20 µJ b. 680nm-950nm :≥ 50 µJ c. 560-1050nm : ≥ 6 µJ d. 340nm- 475nm : ≥ 15µJ (iv) OPA Output Pulse duration (at peak/central wavelength) a. 1120nm-2100nm : ≤ 80 fs b. 680nm-950nm :≤ 50 fs c. 560-1050nm : ≤ 90 fs d. 340nm- 475nm : ≤ 70 fs (FTL, if it can't be measured) (v) The vendor should demonstrate on-site oscillator locking to 59.5 MHz using our RF source master clock at 2856 MHz. The vendor should bring all the required parts and

			accessories for demonstrating the synchronization and repetition system locking.
		(vi)	At the output of the amplifier, Power stability: < 0.5% rms over 8h, Pointing stability: < 20 µrad/°C and M2: < 1.2 should be demonstrated at 1030nm.
		(vii)	At the output of the OPA, Power stability <1 % rms on 8 h at peak/central wavelengths, pointing stability <25 µrad rms at peak/central wavelengths of OPA should be demonstrated.
6	Other criteria	(i)	Laser, OPA and Synchronization unit should be from the same company
		(ii)	Only a complete offer will be accepted and evaluated. Incomplete offer/ parts will be rejected.
		(iii)	The bidder must be a globally recognized manufacturer of Ultrashort laser systems and OPA with a minimum of 10 years of experience in the field. The bidder should have demonstrated a high level of technical expertise and innovation in ultrafast lasers and OPA technology.
		(iv)	The bidder/vendor must demonstrate that similar laser systems, along with the synchronization unit for FELs, are installed at premier institutes in India and abroad. Please provide a list of user details. Expertise in demonstrating the synchronization of FELs using an RF master clock is essential. Additionally, please attach details of such demonstrations from the same vendor and user list with contacts details of indenter. Installation certificates must also be provided.
		(v)	All power supplies must conform to the mains supply: 230 ±10 volts, 50 Hz.
		(vi)	A compliance statement for each item of this document is to be provided along with the technical bid.

Item No-1: Femtosecond Laser with OPA and Synchronization Unit
Global Tender Enquiry (GTE) 06/2025-26 dated 06-02-2026 due 0n 09-03-2025

TWO PARTS TENDER ITEM

UGC-DAE Consortium for Scientific Research
(An Autonomous Institution under University Grants Commission)
University Campus, Khandwa Road, Indore-452 001. (India)
Phone : +91 0731 2361546, 2463913, 2762277 Fax : +91 0731 2361546,
Website: **www.csr.res.in**
E-mail:iucstores@csr.res.in

NOTICE INVITING GLOBAL TENDER No. 06/2025-26 dt 06-02-2026 due on 09-03-2026 at 16:00 hrs.

Director, UGC-DAE Consortium for Scientific Research, Indore invites separately sealed bids from eligible bidders for supply of the following:

Sl. No.	Description of Item Two Parts Tender Item
1.*	Femtosecond Laser with OPA and Synchronization Unit
a.	Detailed tender document is available on our website **www.csr.res.in**. Tender document will be available from **09-02-2026 to 09-03-2026 upto 16:00 hrs.**
c.	Overseas suppliers can participate in the tender directly, provided they do not have Branch Office in India.
d.	The item can be shifted in any laboratory of the consortium in the country.
e.	Amendments if any, will only be published on our website: www.csr.res.in
	Administrative Officer-I (Purchase & Stores Section)

UGC-DAE Consortium for Scientific Research
(An Autonomous Institution under University Grants Commission)
University Campus, Khandwa Road, Indore- 452001 (India)
Phone : +91 0731 2361546, 2463913, 2762267 Fax : +91 0731 2361546, Website: www.csr.res.in E-mail:iucstores@csr.res.in

Item No-1: Femtosecond Laser with OPA and Synchronization Unit
Global Tender Enquiry (GTE) 06/2025-26 dated 06-02-2026 due 0n 09-03-2025

TWO PARTS TENDER ITEM

1.	Tender in sealed cover duly superscribed "Tender No. …. dt…. due on …..for ……. item ……. "Complete with all details, otherwise tender may not be opened/considered. If you are interested to quote more than one items, you shall submit the quotations in sealed cover separately. (*) items as mentioned in the Tender No GLOBAL TENDER ENQUIRY (GTE) No. 06/2025-26 dt 06-02-2026 due on 09-03-2026 at 16:00 hrs must be **quoted in two parts (Part A-Technical and Part B-Financial).** The two parts show separate sealed covers.
2.	Price should be quoted CIP Mumbai & Insurance up to Indore separately (As per INCOTERMS 2010).
3.	Director, UGC-DAE CSR, Indore, reserves the rights of accepting in full or part /not accepting the tenders without assigning any reasons.
4.	The acceptance of tender, will rest with the Director, UGC-DAE CSR, Indore, who does not bind himself to accept the lowest tender and reserves to himself the authority to reject any or all of the tenders received without assignment of any reason.
5.	Delivery and Installation period must be mentioned. (if Installation required)
6.	Liquidated Damages: The penalty for late delivery will be imposed @ 2% per month or a part there of, subject to a maximum of 10% of the total value of the order.
7.	The tender/Bid shall remain open for acceptance for a period of 90 days from the date of receipt.
8.	The decision of the Director, UGC-DAE CSR, Indore, shall be final in all the cases.
9.	Director, UGC-DAE CSR, Indore, shall not be liable for postal delays. The incomplete tenders or the tenders received after due date will not be considered.
10.	Quote your offer along with literatures/catalogues, if any.
11.	We are exempted from the custom duty. The custom duty exemption certificate is issued by Department of Scientific & Industrial Research (DSIR), Govt. of India, New Delhi. Customs duty exemption is in terms of Government Notifications No. 51/96-Customs dated 23.07.1996; No. 24/2007-Customs dated 01.03.2007; No. 43/2017-Customs dated 30.06.2017; No. *42/2022- Customs dated 13.07.2022; No. 07/2024- Customs dated 29.01.2024; No. 38/2024 – Customs dated 23.07.2024.*
12.	GST must be quoted separately, if applicable.
13.	No claim for any tax or duty, not stipulated in the tender will be admitted at any stage.
14.	The tenderer should furnish the users list where similar equipment has been supplied recently.
15.	Special care should be taken to write the rates in figures as well as in words. No overwriting be done on the rates and units.
16.	**Arbitration:** "in connection with the present contract shall be finally settled under the Rules of conciliation and arbitration of the International Chamber of Commerce" should be replaced by "between both parties in connection with the CONTRACT which cannot be settled amicably shall be exclusively & finally settled by Arbitration under the rules of conciliation and arbitration of the **"International Chamber of Commerce, Mumbai"** by one or more Arbitrators appointed in accordance with the said Rules.
17.	No deviation from the stipulated terms and conditions will be allowed. Tenders should be unconditional.
18.	The warranty of the equipment should be for 36 months from the date of commissioning / installation.
19.	It will be obligatory on the part of the tenderer to sign on your offer.
20.	Subject to Indore Jurisdiction.
21.	***The bidder should fully comply with the OM no. F.No. 6/18/2019-PPD dated 23-07-2020 inserting rule 144 (xi) in GFR 2017 by the Ministry of Finance, Department of Expenditure, Public Procurement Division. (Fill Annexure-I)***
22.	N**o advance payment will be made**.
23.	The Performance bank guarantee as per policy of the Government time to time, must be provided till the warranty period.
24.	***The last date for submission of the tender documents is 09-03-2026 up to 16:00 hrs. Tender will be opened on 09-03-2026 at 16.30 hrs. Tenderer (s) / authorized representative(s) may attend on the opening of the tender bids.***
25.	***For Pre-bid: Email: iucstores@csr.res.in till 17-02-2025. AT 11:30 am. UGC-DAE CSR, INDORE***

TWO PARTS TENDER ITEM

Appendix–II

Annexure to Bid Form: Eligibility Declarations
(To be submitted as part of tender/Technical Bid)
(On company letter head)
(Along with supporting documents, if any)
Tender Document No. DPS/XXXX
Tender Tile: Goods
Bidder's Name: ----------
(Address and contact details)
Bidder's Reference No. ---------- Date: ----------
Restrictions on procurement form Bidders from a country or countries, or a class of countries under Ruler 144(xi) of the General Financial Rules 2017.

"We have read the clause regarding restrictions on procurement form a Bidder of a country which shares a land border with India; and solemnly certify that we are not form such a country or, if from such a country, we are registered with the Competent Authority (copy enclosed). We hereby certify that we fulfil all requirements in this regard and are eligible to be considered."

Penalties for false or misleading declarations:

We hereby confirm that the particulars given above are factually correct and nothing is concealed and also undertake to advise any future changes to the above details. We understood that any wrong or misleading self-declaration by us would be violation Code of integrity and would attract penalties as mentioned in this tender document, including debarment.

(Signature with date)

(Name and designation)

Duly authorized to sign Bid for and on behalf of

(Name & address of the Bidder and Seal of Company)