tcg crest
Inventing Harmonious Future

TCG CENTRES FOR RESEARCH AND EDUCATION IN SCIENCE AND TECHNOLOGY
1st Floor, Tower 1, Bengal Eco Intelligent Park (Techna Building),
Block EM, Plot No 3, Sector V, Salt Lake, Kolkata 700091
Website: https://www.tcgcrest.org

Date: 02-03-2026

Notice for purchasing of Device Simulation Software

TCG CREST, Kolkata intends to purchase certain items for its Center for Quantum Engineering, Research and Education (CQuERE) related to the project under National Quantum Mission, by the Department of Science & Technology (DST), Govt of India. Prospective Agencies are requested to submit their lowest possible quotation in a SEALED ENVELOP with “Device Simulation Software” label and DATE duly super scribed on the COVER and on the face of the offer letter addressed to “1st Floor, Tower 1, Bengal Eco Intelligent Park (Techna Building), Block EM, Plot No 3, Sector V, Salt Lake, Kolkata 700091” for the supply of the under mentioned items. Last date for submission of quotation is: 18/03/2026 (by 11:00 am). In addition, a separate email with the quotation should be sent to:
sarbajit.chatterjee@tcgcrest.org
The tender opening date is 19/03/2026 (3:00 pm).
Following specifications are required:

I. TECHNICAL SPECIFICATIONS OF THE SOFTWARE

1. Process simulation capability

Sr No.	Item	Description	Vendor’s remark
1.1	Semiconductor Fabrication Technologies	This software shall be capable of fast and accurate simulation of all critical fabrication processes used in modern semiconductor technologies including: • RF Devices: HEMT, FET, HBT, FET, BJT, JFET, IGBT, SOI, TFT, Fin-FET etc. • Multiple Gate FETs (MuGFETS): FinFET, FlexFET, Gate-All-Around (GAA) FETs, etc. • IR detector and Sensor devices • Solar cells • Primarily focused on compound semiconductors	

1.2	Processes	It should possess advanced physical models for following processes: • Masks and Mask sets • Doping diffusion including rapid thermal annealing (RTA) • Ion implantation • Oxidation with stress effects • Physical etching and deposition, e.g. CVD, PVD, plasma etching, re-emission etching, ion milling, open etching and deposition, RIE, Ion Beam deposition, • Epitaxy and stress formation and strain/stress engineering • Annealing/Diffusion, Annealing/Oxidation, Annealing/Oxidation with diffusion, Annealing/ temperature field, Epitaxy • Optical lithography These process models shall be capable of • Interactive visualization of 2D and 3D structures and distributions as well as 1D cross-sections • Run-time extraction of process parameters • Optimization of process flow and calibration of process models • Easy creation and modification of process flow input decks including automatic control of layout GDS2 mask sequences	

1.3	Process Materials	It should be capable of providing process simulation for variety of materials used in the semiconductor industry like Silicon, III-V, III-N, II-VI, IV-IV but not limited to: • Silicon Carbides (SiC), Compound Semiconductors, e.g. GaN, AlGaN, GaAs, AlGaAs, InGaAs, InP etc. • Silicon, Silicon Germanium (SiGe). • All Schottky and Ohmic contact metals and dielectric/insulating materials used in Semiconductor Nano electronics device technology.	

2. Device simulation Capabilities

Sr No.	Item	Description	Vendor's remark
2.1	Device simulation capability	The device simulation software should be capable of: • Fully Integrated with Victory mesh ➢ Custom shape generation ➢ Transformation (rotate, flip, bend, extrude, spine, reflect, and etc…) ➢ Scalar Fields ➢ Region merging, separating, subdividing and etc ➢ Crop, Slice, Split, Mirror, Join, cutplane, splice, combine, stretch and etc… ➢ Device Remeshing and Refinement • Analyzing and characterizing the electrical, optical, and thermal performance of various devices in 2D and 3D. • Fully integrated with process simulation software, comprehensive visualization package and extensive database of examples. • Material parameters and physical models for a wide range of Silicon, III-V, III-N, II-VI, IV-IV like compound semiconductor materials and polymer/organic based technologies. • Compatible with other device simulators (Smart SPICE and other SPICE)	

3. Modules:

Sr No.	Item	Description	Vendor's remark
3.1	Physics based Models	• It should cater Physics based models like drift-diffusion, energy balance transport equations, surface/bulk mobility, recombination, impact ionization and tunneling models.	

		• The capabilities of all the physical models should be extended to deep submicron devices. • The models should be capable to calculate all measurable electrical parameters which include gate and drain characteristics, sub-threshold leakage, substrate currents, and punch through voltage, breakdown behavior, kink and snapback effects, low temperature and high-temperature operation, RF/AC parameters and intrinsic switching times. • Boltzmann and Fermi-Dirac statistics with band gap narrowing. • Interface to Drift-diffusion and energy balance transport models with advanced mobility models. • Trap dynamics for DC, transient and AC. Models for Shockley-Read-Hall, optical and Auger recombination, impact ionization, band-to-band tunneling, and Ohmic and Schottky contacts. • DC, AC/RF and transient device characteristics can be simulated. • Calculated DC characteristics include threshold voltage, gain, leakage, punch through voltage and breakdown behavior. • Calculated RF characteristics include cut-off frequency, s-, y-, h- and z parameters, maximum available gain, maximum stable gain, maximum frequency of oscillation and stability factor. • Inclusion of Models for graded and abrupt heterojunctions and simulates binary structures such as MESFETS, HEMT's etc. DC, AC/RF and time-domain solutions for general nonplanar homojunction and heterojunction semiconductor device structures. • It should have provision for Monte Carlo simulation • Interface provision that allows user-defined, composition dependent, models and material parameters. • This module should be capable for both 2D and 3D device simulation.	

3.2	Material Library	• It shall cover materials as per para 1.3 • Library of binary, ternary and quaternary semiconductors as well as other important advanced materials along with material parameters. • Built-in materials library that contains parameters for all well-known semiconductor materials. • And allows user to create their own material with user-define materials properties	
3.3	Thermal Effect Simulation	• It should be able to model heat generation, heat flow, lattice heating, heat sinks, and effects of local temperature on physical constant. • It should provide an ideal environment for design and optimization of power devices. • Applications include characterization of device design, thermal failure analysis and heat sink designs. • This module should be capable for both 2D and 3D device simulation.	
3.4	Optoelectronics Device Simulation	• It should be able to model light absorption and photo generation in non-planar semiconductor devices. • It should account for arbitrary topologies, internal and external reflections and refractions, polarization dependencies and dispersion. • Optical transfer matrix method and EM wave method for coherence effects in layered devices. • It should be applicable to a wide array of device technologies including CCDs, solar cells, photodiodes, photoconductors, avalanche photodiodes, Metal-Semiconductor-Metal photodetectors, phototransistors, microlens coupled detector. • This module should be capable for both 2D and 3D device simulation.	

3.5	Circuit simulation	• It should contain physically-based devices in addition to compact analytical models • It should be compatible to small and large signal analysis of RF devices. • It should contain Compact analytical models for high power circuits including variety of devices such as diode, HEMT, bipolar, thyristor, GTO, MOS and IGBT devices. • This module should be capable for both 2D and 3D device simulation. • Unlimited number of 2D or 3D numerically simulated mesh device	
3.6	Noise simulation	• It should be capable of analyzing small-signal noise generated within semiconductor devices. • It should be capable of characterizing small-signal noise sources and extract figure of merit for circuit design. • This module shall preferably be capable for noise device simulations	
3.7	Quantum Mechanical effect simulation	• It should provide a set of models for simulation of various effects of quantum confinement and quantum transport of carriers in semiconductor devices • It should allow quantum mechanical calculation of bound state energies and associated carrier wave functions self consistently with electrostatic potential • This module should be capable for both 2D and 3D device simulation.	
3.8	User defined Models & Library elements	• It should have capability of user defined physical models & material parameters via standard language interface (e.g. C, C++, etc.) • It should have capability of user defined functions such as doping, composition fraction, defect, density of state, temperature and composition dependent band parameters, mobility, recombination and generation models at run-time.	

3.9	Radiation Simulation	• It should allow physics related to radiation's impact on semiconductor device operation to be studied. • It should enable modeling of Single event effects (SEE), total Ionizing dose (TID), dose rate, Irradiation Generation Rate, Dispersive Transport and Insulator Charging in semiconductors. • It should be useful for understanding the Displacement damage modeling, non-ionizing energy loss model and Radiation Fluence Model.	

4. Other interactive tools

Sr. No.	Item	Description	Vendor's remark
4.1	Run time interactive tool	• It should have numerous simulator specific and general debugger style tools, such as powerful extract statements, GUI based process input, line by line runtime execution and intuitive input syntactical error messages. • Should support .str file format for model generation	
4.2	Graphical display and analysis tool	This tool should have following capabilities: • A powerful tool is required to visualize 1D and 2D/3D structures produced by the software simulators. • It should provide visualization and graphic features such as pan, zoom, views, labels, and multiple plot support. • Plotting engine should support all common 1D and 2D/3D data views including: 2D/3D contour data, 2D/3D meshed data, smith charts and polar charts. Exports data in many common formats (jpg, png, bmp, SPICE raw file, and CSV) for use in reports or by third party tools. • The simulation result (xy-type) data generated by the software should be in the format compatible for direct export to spreadsheet like MS excel.	

5. Other terms and conditions:

Sr. No.	Item	Description	Vendor's remark
5.1	Software compatibility	Software shall preferably be compatible with following workstation/hardware specification • Processor: i5/i7 • RAM: 16/32 or more • Hard disk: 500 GB or more • Graphic card: integrated or (Dedicated only if required) • Operating system: RHEL 7/8 with subscription or Rockey Linux 8.10/9.5 (64 bit). • It should support .uds file format for model generation link	
5.2	Software license	All modules and sub modules of software should have time-based licenses. Supplier shall provide software up gradation support as and when applicable within the warranty period	
5.3	Software Version	The offered software should be of latest version. The same should clearly be mentioned in detail.	
5.4	Support documents	The offer should be properly supported with relevant technical leaflets, catalogues as well as application notes demonstrating the claims of the quote. Publications by other agency using the offered software may also be indicated/provided.	
5.5	Compliance	Point by point compliance for all RFP specification should be provided with clear indication of compliance/non- compliance unambiguously.	
5.6	Simulation	LED AND LASER SIMULATION should be AVAILABLE	

TERMS & CONDITIONS

1. Quotation should be for FREE DELIVERY at TCG CREST, Kolkata or quoted on FOR destination basis, unless otherwise arranged.

2. Prices quoted should be Net and minimum period of validity of the quotation SHOULD BE FOR 120 DAYS from the closing date. The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
All duties and other levies payable by the supplier under the contract shall be included in the unit Price. Applicable taxes shall be quoted separately for all items. TCG CREST, Kolkata may or may not provide DSIR certificate wherever GST exemption will be applicable.
3. Quotations cannot be CORRECTED after submission.
4. Any Quotationer already having any legal dispute with the institution need not submit the tender.
5. Manufacturer's NAME and the COUNTRY OF ORIGIN of the materials offered must be clearly specified failing which the Tender will not be considered.
6. All the documents should be authenticated with official stamp and signature / signatures thereon by the bidder.
8. The Quotationers will not be titled to ask for any further information other than whether their tenders have been received or not.
9. Submission of false document(s) / information by the bidder will result into the cancellation of quotation and the Institute may take strict action against that bidder.
10. If the institution finds that the materials supplied are not of the contract quality or not according to the specification approved by the University or otherwise not satisfactory owing to any reason, of which the institution shall be the sole judge, the institution shall be entitled to refuse the acceptance of the said materials, cancel the order and buy its requirement elsewhere at supplier's responsibility.
11. Quotationers must as far as possible, arrange to supply the materials according to the terms of delivery specified in the orders. If however, this is not possible, they shall clearly specify the time in which the delivery of the articles can be effected. This delivery time must be strictly adhered to. Failure to supply within the specified time will lead to cancellation of the order without notice.
12. Being the lowest bidder (L1) in term of quoted amount (incl. all) may not be the only condition to receive the order, other criteria like having PAN, GSTIN, location of the office, and equipment/software's technical merit and advantage for the ongoing research work etc. may also be considered during the selection of the eligible bidder. The decision of the institution in such a case will be the final. For authenticity/genuineness of the quoted product, the firm should be a reputable, well established and suppliers of the goods or services as part of their normal business.
13. In case the selected bidder is unable to supply the items after being selected to supply the items or after receiving the respective order from the institution, the bidder should immediately inform the Authority about the same by e-mail. Decision of the institution in such case will be the final.
14. If any tenderer proposes to charge GST & Delivery charges, in addition to his quoted rates this fact should be stated specifically in his quotation. In the absence of such statement the rate quoted will be deemed to be inclusive of GST & Delivery charges.
15. Payment will be made on the basis of LC (if required).
16. Non-Compliance of an order may lead to cancellation of enlistment and no enquiry will be issued in future.
Up to 10% of bill value may be deducted for default on delivery.

17. Deduction of all taxes as per norms for each Bill/Invoice shall be made by the Authority at the time of payment.
18. Any dispute which may arise between the bidder and the institution regarding this bidding shall be referred to the Director, TCG CREST, Kolkata, whose decision shall be final and binding in this regard.
19. PAN, GSTIN and Bank details of the bidder are to be mentioned in the bill/ invoice.
20. Dealership Certificate: The bidder/tenderer should be either a manufacturer or authorized dealer of the foreign/Indian manufacturer. Dealers or Agents quoting on behalf of Manufacturer must enclose valid dealership certificate. If the quotation is being submitted by dealer, the after sales service will be responsibility of that dealer only. TCG CREST, Kolkata will not directly coordinate with the manufacturers.
21. The institution reserves the right to accept or reject any quotation without showing any reason.