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Validation of the Integrated Tiger Series

(ITS – Version 5.0)

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Outline

- Integrated Tiger Series
- Sources of Error
- Code Application
- Validating the Code
- Metrics
- Conclusion

Integrated Tiger Series (ITS)

- **Models Electron Transport**
  - Algorithm

- Monte Carlo Method
- Physical Approximations
- Probabilities of Interaction

Sources of Code Error

Source of Error	Type
Monte Carlo	Precision
Numerical Representations	Accuracy
Physical Approximations	Accuracy
Probabilities of Interaction	Accuracy
Code Evolution	Accuracy

Code Application

- Medical Physics
- Space Radiation Applications
- Manufacturing Processes
- Weapon Radiation Effects

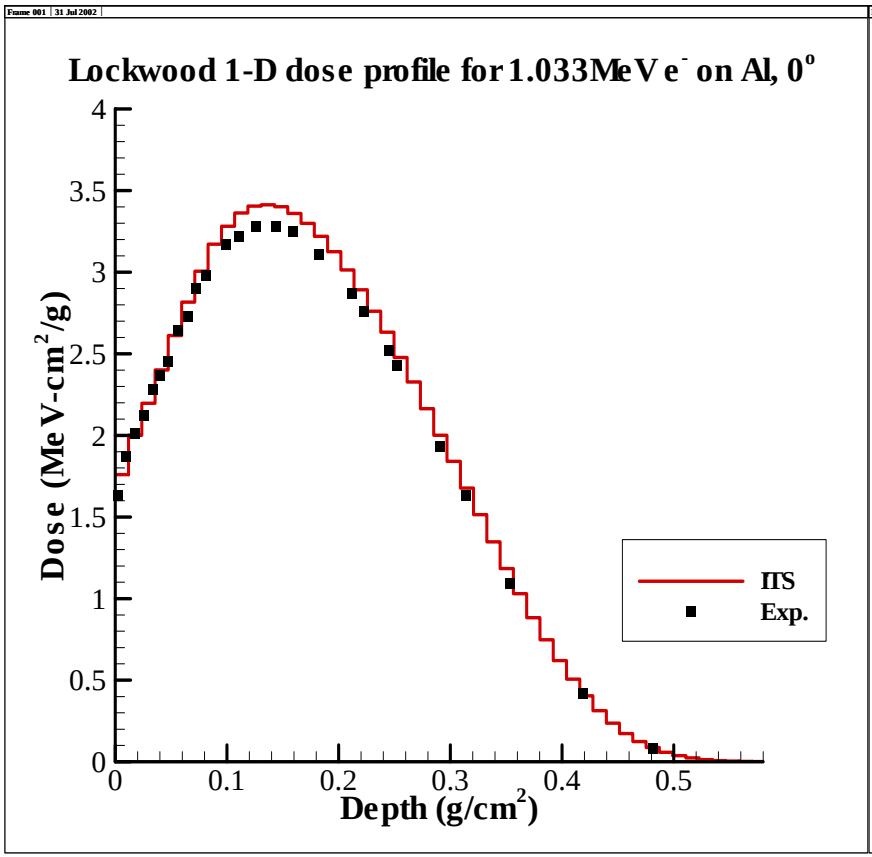
Validating the Code

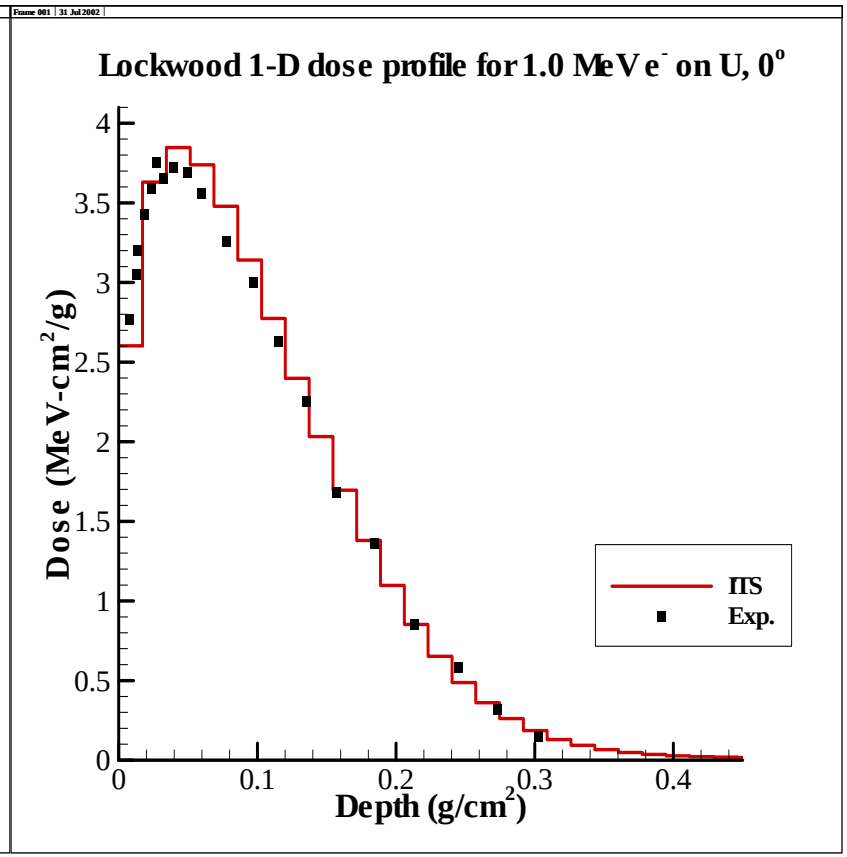
- Reality Check ✓
- Builds Consumer Confidence
- Demonstrates Performance
- Shows Limitations

Lockwood Validation

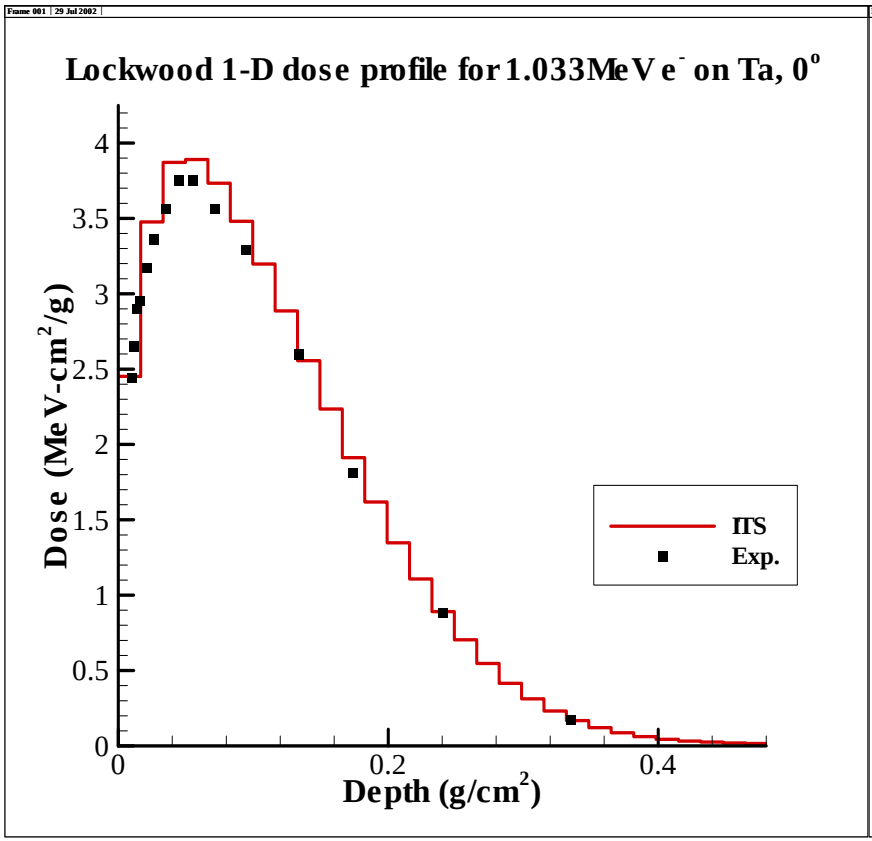
- Tiger, 1-D Code
- Energy Deposition Profiles
- High - Low Z Materials
- Electron Ranges (0.058-1.033 MeV)
- Angles of Incidence (30°, 60°)
- Graphical Comparisons

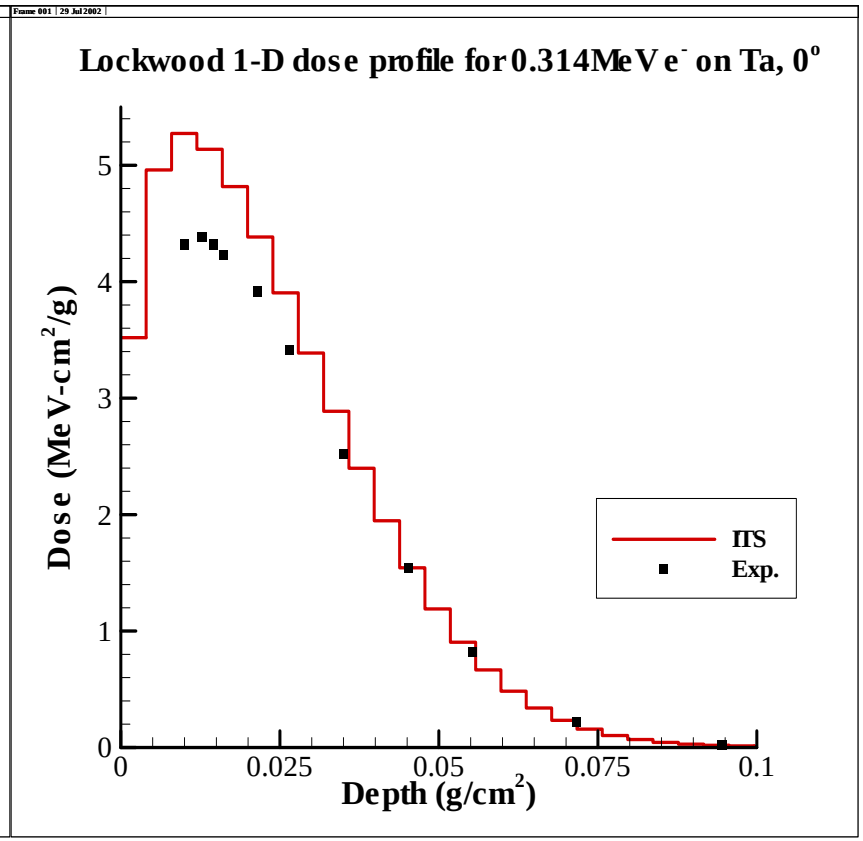
Code Performance (1)





Code Performance (2)





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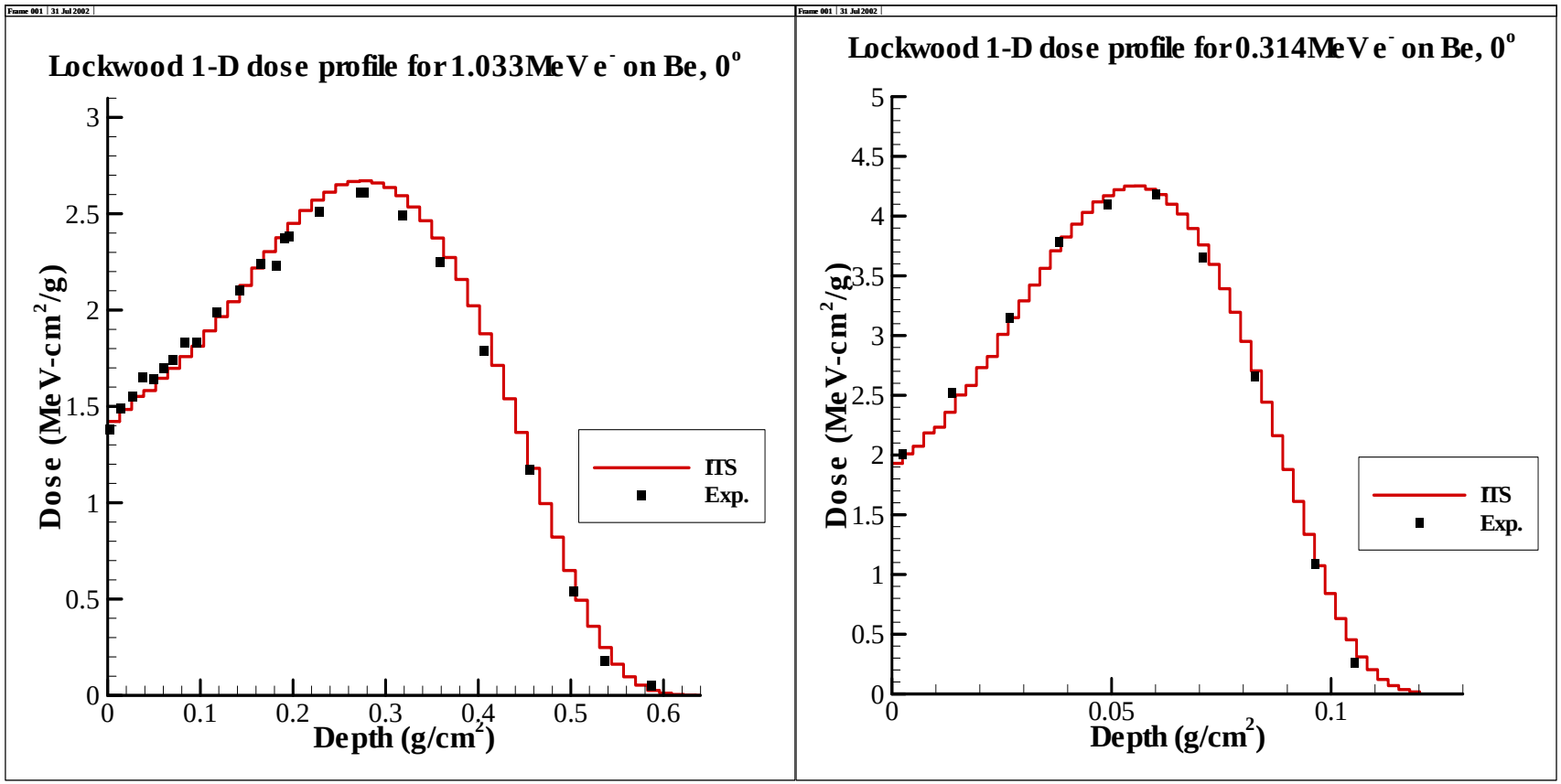
Code Performance (3)



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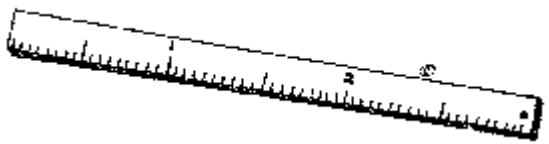
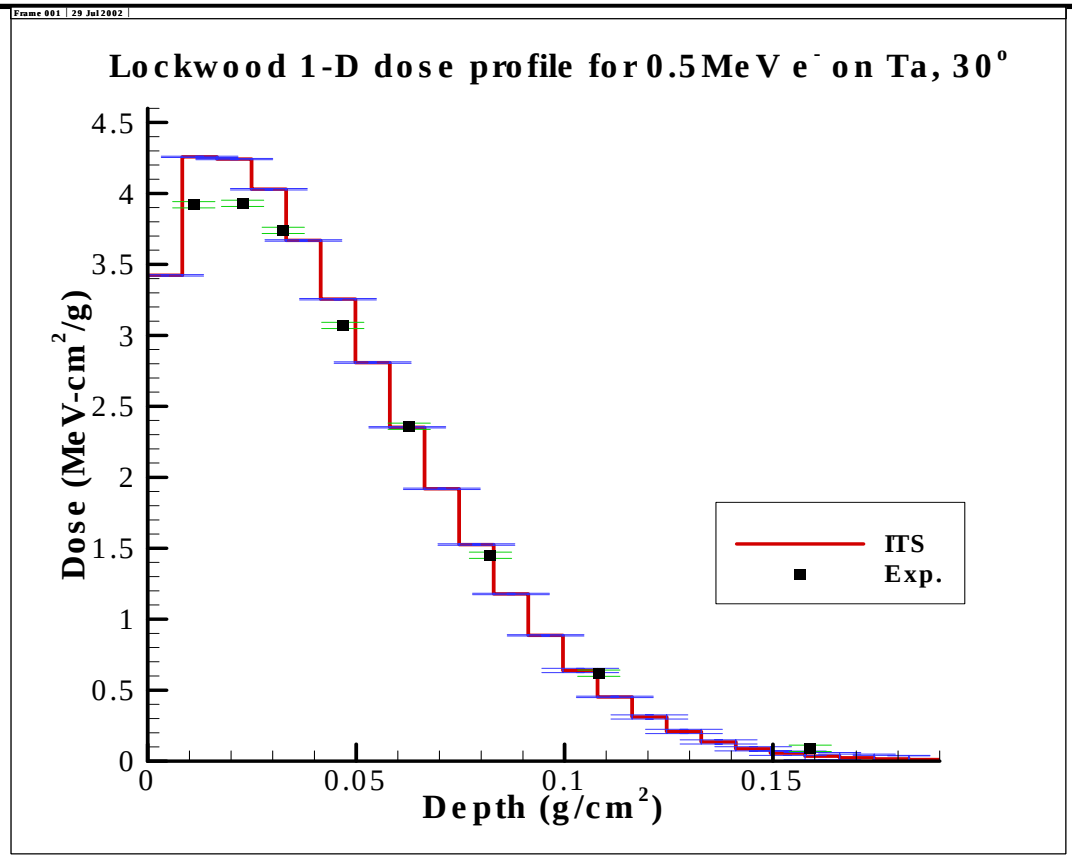
Metrics

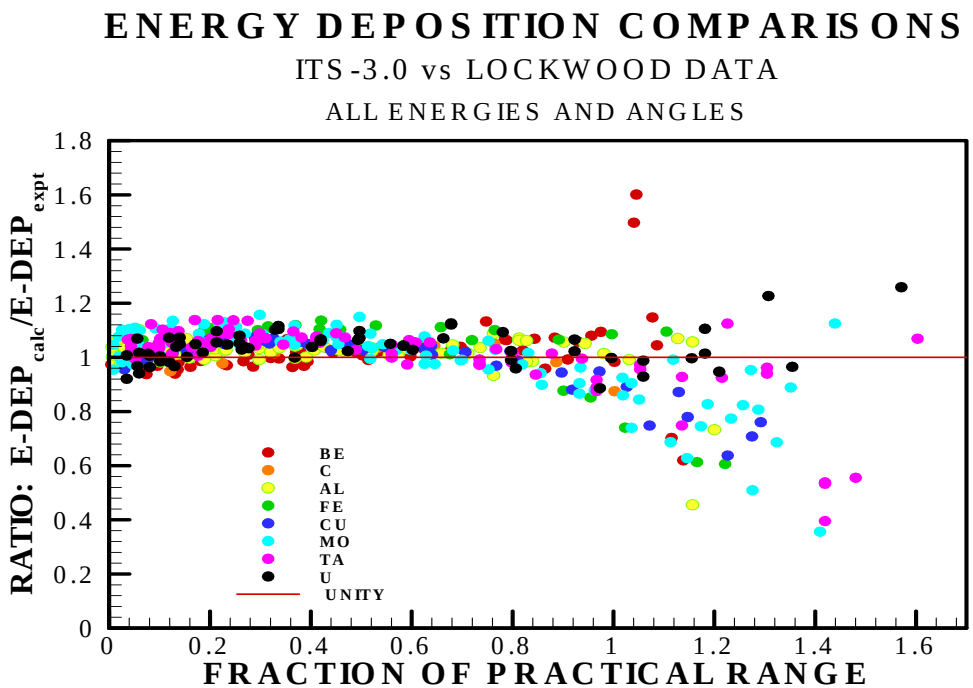
- Measure Performance
- How To Quantify Error ?
- Precision Error Quantified
- Accuracy Error Not Quantified



Statistical Error



Quantitative Comparison ?



Conclusion

- Currently Working on Validation
- Appropriate Set of Metrics
  - Precision Error Quantified
  - Accuracy Error Not Quantified
- Future Work
  - 2-D, 3-D Geometries
  - Different Energies
  - Various Types of Code Output