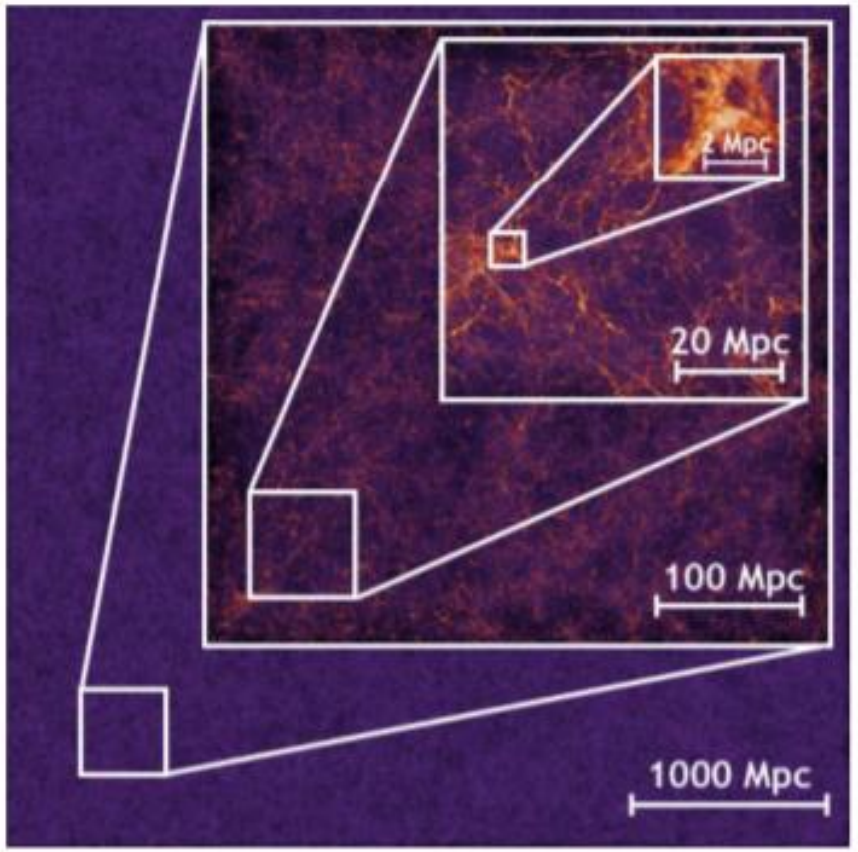
Arm Instruction Emulator Exercises

01_HACC_Build

- This is a simple example
- We build and run the HACCKernels code
- No SVE instructions
  - Only native NEON
- Execute the code



Habib, Salman, et al. "HACC: Simulating sky surveys on state-of-the-art supercomputing architectures." *New Astronomy* 42 (2016): 49-65.

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02_HACC_Inscount

- This example makes use of a very simple client
- Inscount_emulated
  - Counts the number of natively executed and emulated instructions
- Testing for an emulated 128-bit SVE width
- Show how to use -only_from_app flag to only count application instructions

03_HACC_SVELength

- This example builds upon the previous one
- Runs HACCKernel through ArmIE
  - Varies the SVE width
- Investigates the impact

04_HACC_Opcodes

- This example makes use of a new client
- Opcodes_emulated
- Don’t just count the instructions, look at what they are
- Both native and emulated

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05_HACC_Memtrace

- In this example we move away from instructions and look at memory operations

- Memtrace_simple
  - Records every memory instruction
  - Classifies them (read/write)
  - Data size
  - SVE Bundle

- Generates vast amounts of data
  - Requires code instrumentation to enable

- Some basic post processing

06_Fortran_Memtrace

- Repetition of 07_HACC_Memtrace but with a Fortran example
- ISO_C_Bindings for calling profiling interface
- Test from CloverLeaf Kernel Drivers (Accelerate)
  - Easy to reproduce in own code

07_sve2_vecdot_f16

- Demonstrates SVE2 instructions with ArmIE
- Calls VECDOT on float16
- Does not run natively on Fujitsu A64FX, which implements SVE (not SVE2)
- Use ArmIE to run on any Arm CPU, even if it doesn’t implement SVE

08_sve2_histogram_vla

- Demonstrates SVE2 instructions with ArmIE
- Does not run natively on Fujitsu A64FX, which implements SVE (not SVE2)
- Use ArmIE to run on any Arm CPU, even if it doesn’t implement SVE

09_sve2_skipwhitespace

- Demonstrates SVE2 instructions with ArmIE
- Does not run natively on Fujitsu A64FX, which implements SVE (not SVE2)
- Use ArmIE to run on any Arm CPU, even if it doesn’t implement SVE

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Thank You
Danke
Merci
谢谢
ありがとう
Gracias
Kiitos
감사합니다
धन्यवाद
شكرًا
תודה