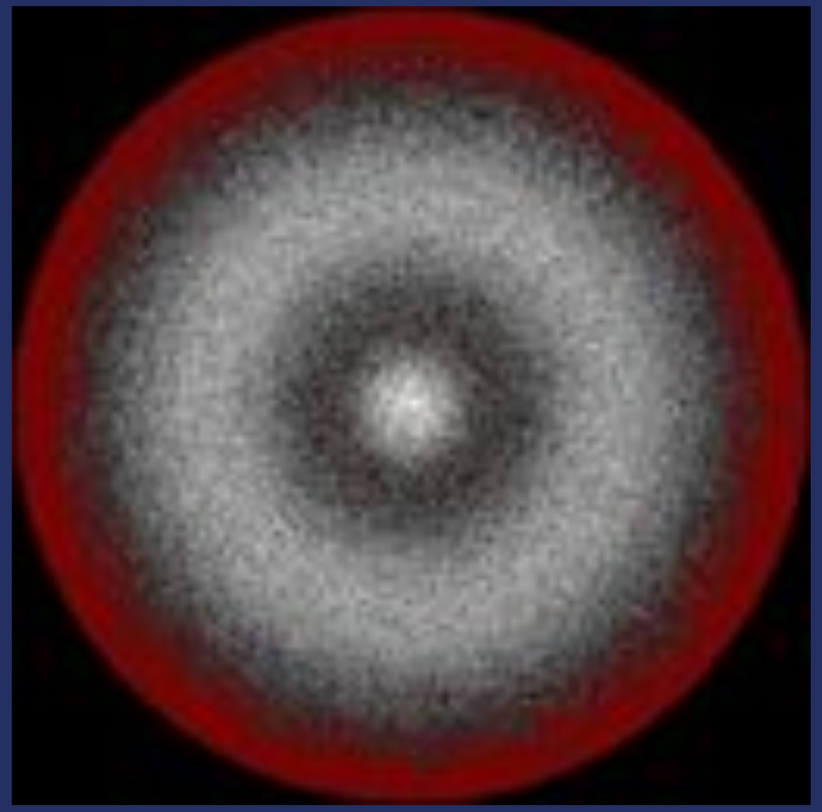
StarHole 1

StarHole Simulation

O-SNAP is experimenting with an alien faster than light transportation technology… somewhat similar to one in a SciFi franchise that featured Richard Dean Anderson.

The scientists need us to accelerate their code so that they can conduct more simulations.



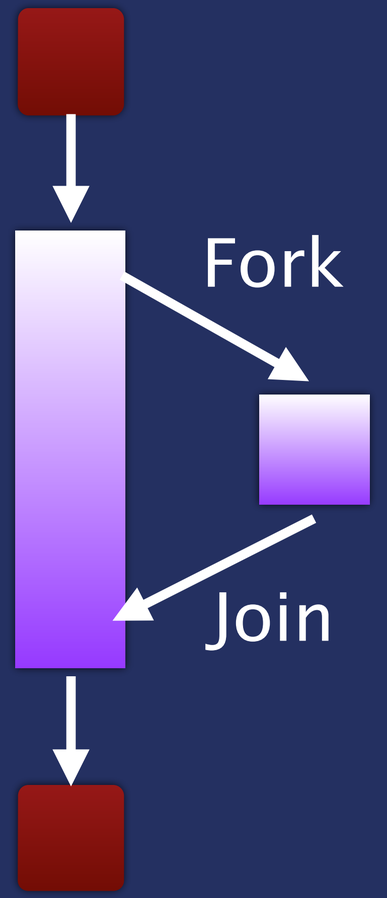
Simulation Core

```
int walker(long int seed, int x, int y, int stepsremaining) {
    struct drand48_data seedbuf;
    srand48_r(seed, &seedbuf);
    int particles = 1;
    for( ; stepsremaining>0 ; stepsremaining-- ) {

        // Does the Carter particle split? If so, start the walk for the new one
        if(doesSplit(&seedbuf, x, y)) {
            long int newseed;
            lrand48_r(&seedbuf, &newseed);
            particles += walker(seed + newseed, x, y, stepsremaining-1);
        }

        // Make the particle walk
        updateLocation(&seedbuf, &x, &y);
    }

    // record the final location
    outArea[toOffset(x,y)] += 1;

    return particles;
}
```

In: starhole_serial.cpp

Fork/Join Pattern

- Concurrency Primitive
- Parent/Child/Sibling relationships between execution threads
- Fork:
  Parent spawns a child
- Join:
  Parent reaps the result from a child



Next Steps

Go to the shell and pull from the repository.

In each of the three technologies (OpenMP, TBB, Cilk) add parallelism to improve performance. The simulation results, given the same command line parameters, must be identical across all versions.