DPLASMA (Distributed Parallel Linear Algebra Software for Multicore Architectures) is the leading implementation of a dense linear algebra package for distributed heterogeneous systems. It is designed to deliver sustained performance for distributed systems where each node features multiple sockets of multicore processors, and if available, accelerators like GPUs or Intel Xeon Phi. DPLASMA achieves this objective through the state of the art PaRSEC runtime, porting the Parallel Linear Algebra Software for Multicore Architectures (PLASMA) algorithms to the distributed memory realm.

**USER DEFINED DATA PLACEMENT**

In addition to traditional ScalAPACK data distribution, DPLASMA provides interfaces for users to expose arbitrary tile distributions, and the algorithms transparently operate on local data, or introduce implicit communications to resolve dependencies, removing the burden of initial data re-shuffle, and providing to the user a novel approach to address load balance.

**FUNCTIONALITY**

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>Linear Systems of Equations</td>
<td>Cholesky, LU (inc. pivoting, PP), LDL (prototype)</td>
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<tr>
<td>Least Squares</td>
<td>QR &amp; LQ</td>
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<tr>
<td>Symmetric Eigenvalue Problem</td>
<td>Reduction to Band (prototype)</td>
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<tr>
<td>Level 3 Tile BLAS</td>
<td>GEMM, TRSM, TRMM, HEMM/SYMM, HERK/SYRK, HER2K/SYRK</td>
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</tbody>
</table>

**FEATURES**

- Covering four precisions: double real, double complex, single real, single complex (D, Z, S, C)
- Providing ScalAPACK-compatible interface for matrices in F77 column-major layout
- Supporting: Linux, Windows, Mac OS X, UN*X (depends on MPI, hwloc)
- Energy Efficiency
  - ScalAPACK: Problem: Solving Linear Least Square Problem (DGEQRF)
  - DPLASMA: Problem: Solving Linear Least Square Problem (DGEQRF)

**FUTURE PLANS**

- Fine-grain Composition of Operations
- Two-sided Factorizations
- Distributed Sparse Solver
- More GPU kernels integration
- LU+RBT