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Hong-Jian Lai* (hjlai@math.wvu.edu), Department of Mathematics, West Virginia University, 320 Armstrong Hall, Morgantown, WV 26506-6310, and **Yehong Shao** (shaoy@ohio.edu), Arts and Science, Ohio University Southern, Ironton, OH 45638. *Some Recent Progresses on Hamiltonian Line Graphs and Claw-free Graphs.*

We shall present a summary of recent results we have done in this area, and methods we have developed in working on these problems. In particular, we have proved the following results.

- (i) (Conjectured by Ryjacek in 1990) Every 3-connected, locally N_2 -connected claw-free graph is hamiltonian.
- (ii) (Conjectured by Kuipers and Veldman in 1996) If H is a 3-connected claw-free graph with sufficiently large order n , and if $\delta(H) \geq \frac{n+5}{10}$, then either H is hamiltonian, or $\delta(H) = \frac{n+5}{10}$ and H can be constructed from the Petersen graph.
- (iii) Every 3-connected, essentially 11-connected line graph is hamiltonian.
- (iv) (Open problem posed by Broersma and Veldman in 1981, JGT) Let k and s be positive integers such that $0 \leq s \leq \max\{2k, 6k - 16\}$, and let G be a k -triangular simple graph. Then $L(G)$ is s -hamiltonian if and only if $L(G)$ is $(s + 2)$ -connected. (Received January 08, 2007)